Manitoba

Annual Report 1986 - 87

Manitoba Health Services Commission

Laboratory and X-Ray Services

April 1, 1986 — March 31, 1987

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MESSAGE FROM THE DIRECTOR

Our Divisional objective is to provide excellent service through the provision of relevant activities. To accomplish this aim our emphasis is to achieve optimal communication with users, a high level of quality assurance programs, optimal educational activities of staff, targetted research and development activities and an active interchange of information with individuals on the local and national scene.

In the past year our service commitments have grown in several areas. In addition to processing an increasing number of specimens in a wider range of diagnostic and public health activities, we have provided extensive service through teaching, consultation, and committee work. For the first time this report acknowledges the broad range of committee activities of many of the Divisional Staff who provide a valuable service throughout Manitoba. Teaching commitments have increased. Divisional consultation activities throughout LAXUS have broadened with additional Divisional responsibilities for Norway House, Hodgson and Mount Carmel Clinic, bringing to a total of 75 units with whom we interact in diagnostic activities. The introduction of new diagnostic methods within existing programs (in neonatal and metabolic screening, rapid diagnosis of respiratory viral infections, sexually transmitted diseases such as chlamydia and gonorrhoeae) and improved diagnostic chemistry technology in several LAXUS head units, have improved our service.

Management activities at the CPL have been streamlined with the addition of detailed cost accounting information. Reviews of in-house protocols and test offerings have resulted in a repriorization of several diagnostic activities.

A major effort has been made to provide direct communication to improve sender errors, and for us to acknowledge reporting errors. Memoranda of agreements have been established for the provision of diagnostic services in LAXUS units. A systematized approach to test review approval processes has been established with MHSC and the College of Physicians and Surgeons.

Regarding our staff, we are fortunate to have highly dedicated and motivated individuals, many of whom have participated in continuing educational opportunities. We enjoyed the opportunity to participate in recognition of the laboratory technologists week by having an open house at the CPL and Portage. We re-established a tradition of meeting and an exchange of information with the staff of Westman Laboratory in Brandon in the fall of 1986. Also, it is with great pleasure that we had the opportunity of establishing the Dr. J. C. Wilt Honorary Lectureship, for which we will have an invited external expert to provide an update on public health issues.

Regarding AIDS virus infections (which remains a noteworthy topic deserving of separate comments), we have been fortunate to have

excellent collaboration with a wide number of individuals in the Province who have provided guidance for management of this difficult issue. In addition, we have established a collaborative outreach seroprevalence program to aid us in determining areas of priority for the management of HIV infections in Manitoba. Additional laboratory and epidemiological research studies are planned.

We look forward to the challenges in 1987/88 to provide relevent and cost-effective provision of diagnostic and public health activities for Manitobans. We encourage your comments and suggestions for future improvements in our service.

LABORATORY AND X-RAY SERVICES DIVISION

SENIOR STAFF LISTING 1986/87

DIVISION DIRECTOR: G. W. Hammond, M.D., FRCP(C) (Int. Med., Med. Micro., Inf. Diseases)

LABORATORY PHYSICIANS:

J. G. Fox, M.D., FRCP(C) (Path.), Dip. Bact. (Tor),
L. H. Sekla, M.B., B.Ch., DTM&H, D.M., Ph.D.,
T. W. Williams, M.B., B.Ch., DPH, FRCP(C) (Ped. & Med. Micro.)

MANAGER, RURAL UNITS: M. W. Burroughs, FCAMRT, A.C.(R), R.C.T.

ADMINISTRATIVE OFFICER, CPL: J. M. Matthews

SCIENTISTS, CPL:

G. Ahluwalia, B.Sc.,
D. E. Gelskey, M.S., MPH, Dr. PH.,
A. C. Maniar, M.Sc., Ph.D., D.Sc.,
P. McNicol, B.Sc., Ph.D.
W. Stackiw, B.Sc.

REGIONAL SUPERVISORS, RURAL UNITS

EASTERN MANITOBA: X-RAY - L. Wilson, R.T., R.C.T.
LABORATORY - Wm. Strukoff, DHA, R.T.

WESTERN MANITOBA: X-RAY - E. Carroll, R.T., R.C.T.
LABORATORY - W. Yaschyshyn, R.T.

NURSE EPIDEMIOLOGIST: D. Phippen, Reg.N., B.A.

DIVISION SPECIALIST TECHNOLOGIST: S. Giercke, A.R.T.

EDUCATION OFFICERS

X-RAY: J. D. Brownlee, B.Sc., R.T.
LABORATORY: A. N. C. Delaat, A.R.T.

DIVISION ACCOUNTING CLERK: C. McComber

LABORATORY AND X-RAY SERVICES DIVISION

PERSONNEL REPORT

During this fiscal year, the Division welcomed new staff:

Louise Blahitka - Selkirk Lab & X-ray Unit
Sheila Bokor - Gladstone Lab & X-ray Unit
Carolyn Brady - Pinawa Lab & X-ray Unit
Deborah Cosgrove - Reston Lab & X-ray Unit
Thomas Cowan - B.M.H.C. (Term)
Rose Derksen - Morris Lab & X-ray Unit
Jacqui Fraas - Dauphin Lab & X-ray Unit
Karen Friesen - Altona Lab & X-ray Unit
Darlene Goertzen - Winkler Lab & X-ray Unit
Leslie Hoare - Virus Isolation Section, CPL
Sharon Howe - Pinawa Lab & X-ray Unit
Susan Hunter - Swan River Lab & X-ray Unit
Bruce James - Teulon Lab & X-ray Unit
Linda Kindray - Swan River Lab & X-ray Unit
Marge Kluke - Beausejour Lab & X-ray Unit
Diane Koss - Roblin Lab & X-ray Unit (Term)
Debra Kozak - Portage Lab & X-ray Unit
Lois McDonald - Killarney Lab & X-ray Unit
Linda McDonell - Swan Lake Lab & X-ray Unit
Kerri McFadzean - Originally Reston Lab & X-ray Unit, currently Gladstone Lab & X-ray Unit
Faye McGregor - Originally Gladstone Lab & X-ray Unit, currently Winkler Lab & X-ray Unit
Lorraine McKay - Administrative Support Section, CPL
Pat Metcalfe - Treherne Lab & X-ray Unit
Cheryl Murphy - Administrative Support Section, CPL
Shelly Olsen - Originally Gimli Lab & X-ray Unit, currently Teulon Lab & X-ray Unit
Louise Pinkerton - Killarney Lab & X-ray Unit
Brian Pitts - Treherne Lab & X-ray Unit
Dorothy Rempel - Winkler Lab & X-ray Unit
Carol Rodericks - Portage Lab & X-ray Unit
Don Salter - Dauphin Lab & X-ray Unit
Leslie Sanderson - Boissevain Lab & X-ray Unit (Term)
Maria Schram - Crystal City Lab & X-ray Unit
Kristel Sierens - Treherne Lab & X-ray Unit
Dean Sigurdson - Administrative Support Section, CPL
Lee Steski - Russell Lab & X-ray Unit
Don Taylor - Morden Lab & X-ray Unit
Leona Tetrault - Emerson Lab & X-ray Unit
Jennifer Vassart - Neepawa Lab & X-ray Unit
Wendy Winther - Clinical Microbiology Section, CPL

Retirements

Helen Bojarski - B.M.H.C. - 19 years
Nellie Connolly - Administrative Support Section, CPL - 10 years
Mary Sitka - Selkirk Lab & X-ray Unit - 10 years
Peter Unrau - Morden Lab & X-ray Unit - 7 years

Resignations

Frederick Barker - Clinical Microbiology Section, CPL
Frances Borley - Swan River Lab & X-ray Unit
Lori Colwell - Metabolic Diseases Section, CPL
Deborah Cosgrove - Reston Lab & X-ray Unit
Mike Evans - Administrative Support Section, CPL
Linda Fish - Selkirk Lab & X-ray Unit
Maureen Grieger - Swan River Lab & X-ray Unit
Susan Hildebrand - Morris Lab & X-ray Unit
Bruce James - Teulon Lab & X-ray Unit
Pat Jasper - Portage Lab & X-ray Unit
Sandra Johnson - Dauphin Lab & X-ray Unit
Charlotte Klassen - Killarney Lab & X-ray Unit
Debra Kozak - Portage Lab & X-ray Unit
Susan Loewen - Winkler Lab & X-ray Unit
Shelley Mitchell - Gladstone Lab & X-ray Unit
Ahilia Nauth - Administrative Support Section, CPL
Ludi Pascual - Emerson Lab & X-ray Unit (Deceased)
Ken Rapinchuk - Lac du Bonnet Lab & X-ray Unit
Ila R. Robillard - Portage Lab & X-ray Unit
Marla Wishart - Gimli Lab & X-ray Unit

Promotions

Joyce Barker - MG2, Dauphin Lab & X-ray Unit, November 8, 1986
Shauna Danyluk - MG3, Swan River Lab & X-ray Unit, September 13, 1986
Elfreide Federau - Reclass LB2, CPL, May 1, 1986
Brenda Klassen - MG2, Lac du Bonnet Lab & X-ray Unit, January 6, 1987
Patti Pugh - Reclass LB3, CPL, May 1, 1986
Dorothy Rempel - CT3, Winkler Lab & X-ray Unit, October 13, 1986
David Speiss - MG3, Neepawa Lab & X-ray Unit, June 30, 1986
Mary Jean Usunier - MG2, Rossburn Lab & X-ray Unit, September 2, 1986
Gail White - MG4, Dauphin Lab & X-ray Unit, September 20, 1986

LABORATORY AND X-RAY SERVICES DIVISION

EXTERNAL COMMITTEE ACTIVITIES OF STAFF - 1986/1987

Mr. J. D. Brownlee:
- Manitoba Association of Medical Radiological Technologists
  - Chairman - Faculty Liaison Committee
  - Post Graduate Chairman
  - Chairman of Constitution and Bylaws
  - Parliamentarian
- Member - 40th Anniversary Reunion Committee - Manitoba Government Medical Technologist Training Programs

Mr. M. W. Burroughs:
- Chairperson - Medical Radiological Technology Advisory Committee, Red River Community College
- Member - Program Liaison Committee, Red River Community College
- Secretary - Provincial Ultrasound Advisory Committee
- Member - Advisory Committee - Low Osmolar Contrast Media

A. N. C. Delaat
- Continuing Education Coordinator - Manitoba Branch - Canadian Society of Laboratory Technologists
- Member - Advisory Council - Med. Lab. Technology Program - Red River Community College
- Member - Biological Technology Program - Red River Community College
- Member - Seconded Trainers Committee - Development and Training - Civil Service Committee Manitoba
- Member - Health Component Exectuive - MGEA
- Member - Advisory Committee - Med. Laboratory Sciences Certificate Program - University of Manitoba

Dr. J. G. Fox:	- Manitoba Medical Laboratory Technology Training Program Advisory Committee, Red River Community College
	- Manitoba Perinatal Screening Committee
	- AFP Screening Committee
Dr. D. Gelskey:	- Chairman - Manitoba High Blood Pressure Reduction Coalition
	- Manitoba Heart Foundation Education Committee
	- Manitoba Public Health Association Planning and Policy Committee
	- Federal/Provincial Committee on Dental Health Promotion
	- University of Manitoba Working Committee on establishing the University as a World Health Organization Collaborating Centre
	- Search Committee for Stomatology Department Head, Faculty of Dentistry (1986)
	- Community Medicine Advisory Comittee, Faculty of Medicine (1986)
	- New Equipment Selection Committee, Radiology Department, Health Sciences Centre
	- Industrial Hygienist Selection Committee, Environment and Workplace Safety and Health Department
Dr. G. Hammond:	- Chairman - Manitoba Advisory Committee on Infectious Diseases (MACID)
	- Chairman - HIV Advisory Subcommittee
	- National Advisory Committee on Immunization (NACI), LCDC, Ottawa
	- Influenza Subcommittee of NACI
	- Technical Advisory Committee on Laboratory Services (TAC), LCDC, Ottawa
	- Standing Committee on Diagnostic Services, Manitoba
	Visiting Scientist Committee (Medical Microbiology, Univ. of Manitoba)

Dr. A. Maniar	- Chairman - Water and Waste Committee of the Manitoba Environmental Council
Mrs. J. Matthews	- Diagnostic Tests - Task Force, Health Sciences Centre
Miss D. Phippen	- Infection Control Subcommittee of the Manitoba Advisory Committee (MACID)
	- Community and Health Infection Control Association (CHICA)
	- Manitoba Health Services Commission/ Departmental Infection Control Committee
Dr. L. Sekla	- Member - Manitoba Medical Association, Section of Preventive, Occupational and Environmental Medicine.
	- Member - Manitoba Medical Association, Ad hoc Computer Committee
	- Member - Manitoba Health Ad hoc Food Committee
	- Member - Manitoba Senior Health Officials Committee of Health Protection Branch, Health and Welfare Canada
Mr. R. Thompson:	- Perinatal Screening Committee
	- Alphafetoprotein Study Team
Dr. T. Williams	- Manitoba Standing Committee on Medical Manpower
	- Pharmacy and Therapeutics Committee of Children's Hospital
Mr. L. Wilson:	- Chairman - Committee of Radiology Managers of Manitoba

CADHAM PROVINCIAL LABORATORY

ADMINISTRATIVE SERVICES SECTION

The Administrative Services Section provides support services to the CPL, to the rural lab & x-ray units and to the various health facilities and practitioners throughout the province. The section consists of accounting, building management, clerical, data entry, receiving, mail, stores, and purchasing.

During this fiscal year a major review conducted by the MHSC Internal Auditor resulted in a realignment of reporting relationships within the section. Clerical staff assigned to the Serology Lab and Metabolic/Chemistry lab are now reporting to the Chief Technologists of those laboratories.

The Data Entry section remains as a centralized service to the computerized programs. Close monitoring of both data entry errors and sender errors was conducted during this fiscal year. The data entry errors were primarily in entering the wrong physician number or the wrong facility number. Data entry errors averaged .1% of total entries. Sender errors were considerably higher. Sender errors include wrong physician and facility numbers, illegible information, and no indication of the sender. Major efforts are being made to improve our data entry error rate and to inform senders of their errors.

The Building Manager was involved in several building improvement projects. These include:

- upgrading a laboratory to a P3 containment level. The CPL wishes to acknowledge the financial assistance of the Laboratory Centre for Disease Control, Ottawa in this work since the room is now at a level to handle work on HIV culture techniques.

- erecting chain link fencing around the property.

- installation of a ventilation system above the washup area's slopsink.

- relocating data entry to the second floor; disconnecting and reconnecting terminals.

The CPL inventory of stock items showed a count of 834 products containing 712,736 items, 8 of which were at variance (with a shortage of $3.25 in a total inventory value of $273,300).

Accounting activities include the preparation and submission of all purchasing documents (requisitions, invoices, direct purchase orders etc.) plus verification of invoices to purchase orders for price and quantity variances. This section processes all customs clearances, travel and mileage claims, requisitions and invoices.

The Specimen Receiving and mail section has experienced a dramatic increase in incoming goods, primarily in material to be routed to other city institutions. Difficulties are still being experienced in shipping goods under the Dangerous Goods Regulations, especially those that are packed in dry ice.

Direct delivery system from the mainframe computer to approximately 70 remote terminals is under development. The computer programming of the Serology Laboratory is scheduled to start at the beginning of the 1987/88 fiscal year. Desk-top work processing units are being actively researched and activities are underway to upgrade and improve our telephone service.

CADHAM PROVINCIAL LABORATORY

CLINICAL MICROBIOLOGY

This section receives specimens from patients and a search is made for both bacterial and fungal pathogens.

Highlights

Sexually transmitted diseases are the most common reportable infectious diseases in the Province. Detection of the causal agents of these diseases accounts for a large portion of the work done in the Clinical Microbiology section. The major bacterial pathogen is Chlamydia trachomatis which causes infertility, abortion, pelvic inflammatory disease, urethritis and cervicitis in adults as well as conjunctivitis and respiratory problems in newborns and infants of infected adults. The original means of detection was by culturing of patient specimens and later by direct fluorescence testing. An enzyme immunoassay test was evaluated in collaboration with Dr. R. C. Brunham and Dr. B. Binns (U. of M. and HSC). This test was also found to be sensitive and specific and was introduced into the routine laboratory this year to manage the large workload as it is less labour intensive.

Gastroenteritis is still a major problem in Manitoba. Although the number of pathogens isolated in the enteric section did not show an overall rise, the numbers of enteric pathogens detected remain high. Small epidemics of Salmonella bovis morbificans and S. hadar associated diarrhoea were identified during the year.

In order to monitor safe handling of toxic medications (e.g. anticancer drugs) by health personnel, a request was made for the development of the Ames test. This test is conducted on the urine of people being monitored and is capable of detecting the presence of mutagenic agents. Thus people absorbing small amounts of these drugs can be detected. This test is now available at the CPL.

A more rapid method for detection of toxin in the stools of people who have antibiotic associated diarrhoeae has been developed. This is now in routine use in CPL.

The development of resistance to commonly used antibiotics is continually monitored. There has been no major change in these patterns in the past year.

CADHAM PROVINCIAL LABORATORY

VIRUS DECTECTION SECTION

Activities in the Section during the year have focused on developing more rapid viral diagnostic tests for the detection of viral antigens. These tests include the diagnosis of respiratory syncytial virus (RSV) and rotavirus infections by enzyme immunoassays. Comparative studies of these diagnostic systems have been performed. The techniques have now passed from an evaluation stage to practical in-house laboratory tests which have been utilized for rapid clinical diagnosis and several of the technologists are now trained in these methods. In the winter of 1986/87 in which approximately one hundred RSV detections were made, several infants were treated with Ribavirin for severe RSV infections. Large numbers of specimens were submitted from nursing homes where gastroenteritis outbreaks were found to be caused by rotavirus and Norwalk-like viruses. Immune electron microscopy has played a role in the diagnosis of Norwalk-like virus infections.

Good progress has been made in the implementation of diagnostic methods for human papillomavirus infections (HPV). Collaborative projects are ongoing in the study of the progression of uterine cervical dysplasia, the treatment of genital warts and the evaluation of laryngeal papillomas, all associated with HPV. Several staff have received training in nucleic acid diagnostic technology.

Additional studies continue with the diagnosis of enteric adenovirus infections by nucleic acid hybridization studies in collaboration with Dr. C. Hannan and with graduate student Tim Scott-Taylor. Julian Joshua completed his B.Sc. Med. project, on adenovirus sensitivity to ribavirin.

Collaborative studies continue with Dr. F. Aoki in herpes treatment evaluations and influenza epidemiology.

The HIV laboratory has been accredited as a P-3 biosafety facility, a scientist has obtained training in the diagnosis of this virus infection and future studies are planned.

Staff in the tissue culture laboratory continue to provide the maintenance of cell lines, stocking of cell lines, and in the preparation of quality media.

CADHAM PROVINCIAL LABORATORY

ENVIRONMENTAL MICROBIOLOGY SECTION

The Environmental Microbiology Section tests environmental samples (water, waste, food and air) to detect microbiological contamination.

1. Highlights

1. Water Analysis

a) A total of 539 water samples were tested for Pseudomonas aeruginosa; 105 (19.4%) were positive. Fifty-seven (57) isolates from whirlpools, swimming pools and lake water were serotyped. Serotype 6 was most frequently identified in 1986, being isolated from Winnipeg (3 different locations), Stonewall, and Selkirk. A comparison with the serotypes identified in 1985 and 1984 is as follows:

Pseudomonas	aeruginosa	Serotype	1984	1985	1986
"	"	1	0	1	2
"	"	2	2	0	1
"	"	3	0	0	0
"	"	4	2	12	8
"	"	5	2	0	0
"	"	6	0	6	17
"	"	7	0	0	1
"	"	8	0	0	0
"	"	9	4	2	2
"	"	10	7	2	3
"	"	11	9	6	2
"	"	16	0	0	3
"	"	Untypeable	0	0	18

b) Ninety-eight (98) samples of water were tested for Salmonella and 16 were positive. Two (2), S. hadar, were isolated from the Red River, out of 78 surface water samples tested. The remaining 20 samples were obtained from 20 turtle tank waters in pet stores in the City of Winnipeg. Salmonella spp. were

isolated from 12 tanks and the serotypes were as follows: S. enteritidis 4, S. panama 3, S. pomona 4, S. manhattan 1, S. newport 1, S. arizona 1.

On two occasions, 2 different serovars were identifed in the same tank.

c) Tests for resistance to multiple antibiotics were done on 217 E. coli isolated from 9 different locations on the Red River. Twenty-two (22) exhibited resistance to more than 3 antibiotics but none showed the presence of an R factor.

d) Forty-six (46) samples of well water were examined microscopically for the presence of sulfur and iron bacteria, which are nuisance microorganisms causing fouling and plugging of wells. Twenty-five (25) were positive, with Crenotbrix and Galionella being the 2 genera most commonly seen.

e) Requests for testing waters for Legionella pneumophila continued to be received. A new method of concentrating waters (using membrane filtration and elution) reduced the time required for processing the samples and improved the efficiency of recovery. A total of 97 samples were submitted and 22 were positive. L. pneumophila serogroup 1 was identified in 18 samples from the hot water system of a hospital in Manitoba and in 1 sample from a cooling tower. L. pneumonphila serogroup 3 was identified 3 times from the water supply of a private home.

2. Of two samples submitted for fungal detection, Scopulariopsis spp. and Hormodendrum spp. were identifed from a cooling tower water sample.

3. In collaboration with Agriculture Canada, the program of testing egg washes was continued. A total of 170 samples were tested for Standard Plate Counts and 29 were found to have unacceptable counts of $\geq$100,000 per mL. These results are used to evaluate the overall plant sanitation of grading stations across Canada. Manitoba continues to have the lowest standard plate counts in Canada.

4. On a total of 256 occasions, food samples were submitted in relation to suspected food poisoning. On 10 occasions, pathogens and/or unacceptable bacterial counts were detected, detailed as follows:

a)	Staphylococcus aureus	Muskrat meat	1 person ill	The Pas
b)	" "	Salad	1 person ill	Winnipeg
c)	" "	Frozen shrimp	2 persons ill	Winnipeg
d)	" "	Hamburger	Not marked	Winnipeg

e)	" "	Hamburger	Not marked	Winnipeg
f)	Salmonella hadar	Chicken	4 persons ill	Winnipeg
g)	Salmonella heidelberg	Chicken McNuggets	1 person ill	Churchill
h)	Salmonella bovis morbificans	Processed meat	1 person ill	Winnipeg
i)	Clostridium botulinum, Type E	Walrus	2 persons ill	Belcher Island
j)	High counts of E. coli	?	Outbreak in nursing home	Winnipeg

5. In collaboration with the City of Winnipeg inspectors, the surveillance of milkshake machines was continued. A total of 1614 ice cream samples were tested. High bacterial counts were detected in 313 instances. Failure to meet acceptable bacterial standards on two consecutive occasions resulted in closing ice cream freezer machines in 39 instances.

6. Campylobacter was isolated from 3 out of 5 samples of raw milk referred to the Cadham Provincial Laboratory.

II. Research and Development

1. Recreational Waters:

In collaboration with the Department of Environment and Workplace Safety and Health, the study on the bacteriological quality of 20 beaches on Lake Winnipeg and the Whiteshell Provincial Park was continued during the summer of 1986. A total of 2709 samples were collected in triplicate for faecal coliforms, faecal Streptococci, and E. coli. Ninety-seven (97) individual samples had fecal coliforms counts >200/100 mL, 599 had faecal streptococci counts >33/100 mL and 70 had Escherichia coli counts >77/100 mL. However, in all locations the geometric means of faecal coliforms met the Canadian Guidelines for recreational waters.

2. Water Quality, North Manitoba.

At the request of the Department of Indian Affairs and in collaboration with Sene Consultants of Ontario, the Cadham Provincial Laboratory tested a total of 221 samples of water collected from 5 different locations in Northern Manitoba, between June and December 1986. Of the 85 samples of treated water tested, four had total coliform counts >2/100 mL, two had faecal coliforms, 1 had a Standard Plate Count >500/mL, 3 had faecal Streptococci, and none had any detectable Salmonellae.

A total of 302 samples were tested for total coliforms and 12 were found to have counts >2/100 mL. Details of the other parameters tested are shown in the tables.

3. Detection of Giardia lamblia in Water

Giardia lamblia is the most common enteric protozoa in North America. Many infections are water borne. In response to multiple requests from the field, the Cadham Provincial Laboratory developed a rapid procedure for the concentration (by membrane filtration) and detection (by indirect fluorescent antibody testing) of Giardia cysts in water. This technique is sensitive enough to allow for the detection of 1 cyst/100 mL of water. The cyst can be identified by phase contrast microscopic examination of the fluorescent antibody labelled concentrate. Hyperimmune Giardia antibodies were raised in rabbits experimentally injected with Giardia cysts.

4. Surveillance of Wading Pools

In collaboration with the City of Winnipeg Health Department the wading pool surveillance was continued in the summer of 1986. faecal coliforms met the Canadian Guidelines for recreational waters.

5. Evaluation of filters and media used for membrane filtration

Six different filters (Fisher, Gelman, Millipore HA, Millipore HC, Nuclepore, Sartorius) and five different media (Millipore m Endo Broth, BBL m Endo LES agar, Difco m Endo LES agar, Gibco M-Endo LES agar and Oxoid m Endo LES agar) were evaluated for the detection of total and faecal coliforms in naturally and artifically contaminated water samples. The filter of choice remains the Millipore HC, for both total and faecal coliforms. For the media, m Endo LES (Gibco) was found to be superior to the m Endo broth (Millipore) in current use at the CPL for the detection of total coliforms, as it produces clearcut results and is less expensive. For the detection and enumeration of faecal coliforms, Millipore's MFC broth remains the media of choice.

6. Evaluation of Broths for the Most Probable Number Technique

Lauryl tryptose and lactose broths were compared as media for the presumptive detection of total and faecal colifroms. As Lauryl tryptose is 30% more expensive than lactose, and as the false positives using lactose broth are eliminated by the required confirmatory procedure, it was decided to continue using the lactose broth.

7. Confirmation of Coliforms detected in potable water

In compliance with the recommended procedure in the 16th Edition of Standard Methods for the Examination of Waters, all coliforms detected by membrane filtration of drinking waters are confirmed by subculturing pure colonies into Lauryl Tryptose Broth and Brilliant Green Bile Broth.

8. Staphylococcal Enterotoxin Detection in Food

In collaboration with Health Protection, Canada, two commercial kits were evaluated, a Latex agglutination (LA) and an Enzyme-linked Immunosorbent Assay (ELISA). Preliminary results indicate that ELISA is more sensitive but more lengthy than LA. Both procedures detected toxins A, B, C, and D in Staphylococcal cultures but did not detect the toxin in seeded foods.

9. A Study of "Ready to Eat" Foods

In collaboration with the City of Winnipeg inspectors and the STEP program, a summer project was conducted to study the bacteriological quality of "ready to eat" foods. A total of 135 sandwich mixes, 189 salad mixes, and 41 barbecued duck and pork meats were tested. Overall, 70% of the 324 samples exceeded the levels recommended for indicator bacteria and pathogens in foods (i.e. 75% of sandwiches, 62% of salads, and 13% of BBQ meat). Coagulase positive Staphylococcus aureus was found in chicken salad, egg salad, macaroni salad, potato salad as well as in BBQ duck and pork. Enterotoxin type A and C were detected in the latter. Salmonella hadar was isolated from BBQ luck. Pathogens were isolated from 13% of the 41 samples of BBQ meats (20 duck, 19 pork and 2 miscellaneous). Therefore, these products can be a health hazard, especially when stored at room temperature for prolonged periods. Interestingly, negative indicators of contamination did not always indicate the absence of pathogens.

10. Arboviruses

The Arbovirus Surveillance was discontinued in 1986. However, testing of sparrows for the Department of Environment, Workplace Safety and Health was continued. Sparrows were tested from 16 different locations in Manitoba. A total of 789 samples of blood were obtained, 476 of these collected from juvenile birds. None of the 789 sera tested had antibodies to Western Equine Encephalitis. There were no human cases in 1986.

CADHAM PROVINCIAL LABORATORY

SEROLOGY/PARASITOLOGY

The Serology section detects the presence of antibodies or antigens in blood samples submitted either for the diagnosis of infectious/autoimmune diseases or for the assessment of the immune status of an individual.

The Parasitology sub-section identifies parasites present in faeces, urine, blood or tissues.

The highlights of the Serology/Parasitology section are as follows:

I. A.I.D.S.

This program, started in December 1985, has expanded gradually in 1986; however, a marked increase was noticed in the first 3 months of 1987. By April 1, 1987 a total of 1238 sera were tested for diagnostic purposes and 80 persons found to be positive, all belonging to high risk groups. To date, the infection in Manitoba is only documented in homosexuals, bisexuals and hemophiliacs. In addition to the diagnostic program, sera were tested (STAT) for all organ donors; as well, a number of additional serological studies were conducted. Anonymity is preserved, as all samples are received coded. Current laboratory protocol includes a screening test using two different ELISA (Abbott and Ortho) and confirmation by an IFA test using slides purchased from Armand Frappier Institute (IAF Production Inc.). The following graph summarizes the findings. In collaboration with LCDC, efforts are ongoing in 1987 to computerize all the diagnostic data. (See Figure 2).

II. Changes in Programs

Prenatal testing for Toxoplasmosis was discontinued in July 1986. The College of Physicians and Surgeons and the Manitoba Medical Association were informed of that change.

III. Interesting findings

1. The province-wide outbreak of measles (reported in the 1985 Annual Report) continued well into the fall of 1986. ELISA for the detection of specific IgM antibodies was found to be a useful test allowing a diagnosis of recent measles to be made on acute bloods. However, in 20% of the clinically confirmed cases, IgM antibodies were detected only in the convalescent sera. ELISA-M was evaluated against CF, HI, Nt, and ELISA-G tests performed on paired sera.

2. In 4 patients with pneumonia, tests for specific IgM antibodies to Chlamydia trachomatis were positive: one had a parrot which died

of Psittacosis and the other 3 were clinically suspected of having TWAR pneumonia. It appears that the Electronucleonic's IFA test detects specific IgM antibodies to a group antigen, i.e. common to all Chlamydia spp. rather than IgM antibodies to C. trachomatis only.

3. Two cases of Tularaemia were diagnosed, one a 15 year old girl from Rose Isle and the other a 27 year old trapper with a history of a muskrat bite.

4. Three cases of Brucellosis were diagnosed in Inuits from Whale Cove and Baker Lake with a history of eating raw caribou meat.

5. A 2 year old boy with eosinophilia was found to have a high titer to Toxocara spp., indicating a Visceral Larva Migrans.

6. A 10 year old was diagnosed as having acquired Cryptosporidiosis while vacationing in Florida.

IV. Research and Development

1. Mrs. R. Kilani's work on the characterization of Cryptosporidium spp. is progressing well. She has developed a new method for the concentration and purification of Cryptosporidium oocysts.

2. An evaluation HBsAg ELISA (Ortho) was done against HBsAg ELISA (Abbott). STAT testing of organ donors would be facilitated as this test can be done along with Anti HIV. The specificity of Ortho was 100%, sensitivity was 98.8% with the problems mainly in borderline confirmed positive HBsAg patients (73.4% sensitivity in this group). As a result we have continued to use the Abbott system for organ donor testing.

3. A passive haemagglutination test (PHA) to detect antibodies to HBsAg (Wellcome) was evaluated against an RIA procedure (Abbott). Using Wellcome's criteria for reading the test, the sensitivity was 83% and specificity 50%. Using CPL criteria, as routinely used for other PHA tests, the sensitivity was 80%, specificity 93%. On those with low levels of antibody the sensitivity was 40% using Wellcome criteria and 33% using CPL criteria. We have not adopted the PHA anti HBsAg test.

4. An evaluation of an IFA test (Electro Nucleonics) for assessing immune status to Varicella zoster was done against the ELISA-G (Behring) that could be used on STAT requests for immunodeficient persons and hospital staff. Sensitivity was 89% (two negatives were borderline positive by ELISA) and specificity was 100%. There was no cross reaction with other herpes viruses. The IFA required only 2 hours to complete versus 4-5 hours for the ELISA. This test, although rapid and inexpensive, will not detect low levels of antibody, i.e. below a 1 in 8 dilution.

5. Measurement of anti Streptococcal DNAse B is used to diagnose complications of Group A Streptococcus infections. Reagents for this test have not been available commercially until recently (i.e. from Behring). This test differs from previous ones in that it uses a DNA-Toluidine blue precipitating agent which makes it easier to read (presence of a precipitate versus a reduction in colour). This test was evaluated using positive sera quantitated by other methods. The relative sensitivity was 100%, all positives were detected, and, in 87%, there was an agreement within 1 dilution. The reproducibility was 95%. Specificity was not done.

6. A screen test for syphilis (NCS VDRL carbon antigen) was evaluated against the test in use (RPR) because of the cost reduction per test. The NCS test was found to be as sensitive and specific as the RPR and technically similar to perform, although initially it was more difficult to read than the RPR.

7. Diagnosis of Toxoplasmosis infections. Two commercial kits were evaluated, TOXONOSTIKA-IgM (Organon and TOXO-M (Abbott). Both use similar ELISA procedures, i.e. detection of specific IgM by an antibody capture technique. These two tests were evaluated against sera found to be positive for IgM to Toxoplasmosis by IFA. On sera which were positive by IFA at titers $\geq$1:40 correlation was 100% by both tests. Correlation was poor (13%) on sera which had borderline positive titers of 1:10, 1:20 by IFA. This may indicate that the low titers by IFA were false positives or that the ELISA tests were not as sensitive. False positive reactions were detected when Rheumatoid factor positive sera were tested in 11/15 (74.4%) with TOXONOSTIKA-IgM and 1/15 (6%) Abbott.

8. Studies were conducted to determine the specificity of the Mycoplasma pneumonia IgM (IFA) test used at the CPL. No cross-reactivity was observed when positive sera from cases of syphilis (10), Hepatitis B surface antigen (10), Adenovirus (3), RSV (3), Parainfluenza 1 (2), Parainfluenza 2 (1), Influenza A (4), Influenza B (1) were tested. Of 10 sera positive to EBV-IgM one was also positive to Mycoplasma IgM (1:10). Of 10 sera positive to measles IgM one sample was positive to Mycoplasma IgM (1:20).

CADHAM PROVINCIAL LABORATORY

TECHNICAL SUPPORT SERVICES

Quality Control Section

Internal proficiency testing is provided to Clinical Microbiology, Viral Detection, Viral Serology and this year, Environmental Microbiology - Food Section, at CPL. All specimens are submitted "blind" and evaluated as clinical specimens.

In LAXUS, "blind" specimens are not possible but Microbiology proficiency testing specimens are sent on a regular basis for culture and sensitivity testing. Other programs sent to LAXUS are: swabs for rapid testing of Beta Strep. Group A; urines for pregnancy testing; serum for testing for infectious mononucleosis; and lastly, slides for Gram stain and interpretation.

Testing of reagents, kits and other consumables such as API's, Urine dip slides, antibiotic discs, etc. for the Division has provided a safeguard against faulty products upon receipt. Coordination of effort is required for products stored at Portage that are not first directed here by the manufacturer.

An extensive evaluation of Urine Dip Slide systems was undertaken for the Division with the assistance from Selkirk Lab and X-ray Unit.

A comparison of NCS Amies Transport Media with Charcoal with media prepared at CPL found that NCS media performed as well as ours and the quoted contract was less than the costs incurred by preparation at CPL.

This section continues to coordinate CAP specimens for Comprehensive Microbiology/Immunology, Virology and Herpes/Chlamydia FA Antigen.

Media Section

This section continues to provide a large number of specialized media for CPL as well as heavy demands for routine media in LAXUS including high volume users such as Portage la Prairie and Dauphin. We have also experienced a large staff turnover; our Unit Leader for 5 years, Paulette Carriere, R.T., is now in Virus Isolation; Pamela Johansen is assigned to Microbiology for Maternity Leave(s) and 4 staff members have come and gone over the past year.

In spite of all these staff changes we have managed to research the following media for additional or alternative use:

1. **LDB Broth** - to enhance environmental Legionella growth.

2. **Clostridium perfringens Test Agars** - for confirmation of C. perfringens

   - EY - FREE TSC AGAR WITH 4% CYCLOSERINE
   - NM AGAR
   - 0.1% PEPTONE

3. **10% Potassium Hydroxide** - used to detect "mousy" odour present in Gardnerella vaginalis infections. This with presence of clue cells on wet prep replaced V-AGAR.

4. **Cary-Blair** holding media for transporting stool specimens; as a preservative of Campylobacter species.

5. **TS with ampicillin** for use in Nucleic acid DNA Lab for screening for E. coli clones.

6. **Biken Agar** - for use in Microbiology of the precipitin line in enteropathogenic E. coli.

7. **Lauryl Sulphate Broth** - for use in Microbiology in the Mutagenicity Test and Clostridium difficile toxin production test.

8. **Versene** - for use in Microbiology.

9. **LB Broth** with Ampicillin for use in Virus Detection section.

Sterilization

This section is the backbone of efficient operation of any laboratory as it must provide effective sterilization, decontamination and scrupulously clean glassware. All these are necessary for accurate laboratory results and laboratory safety for workers at CPL and others handling decontaminated waste.

Numerous complaints over the years of the noxious odours created when dumping autoclaved materials from pots and containers into the slop hopper have been resolved. Extensive construction was required to provide an exhaust fan over the slop hopper with odours vented to the outside.

CADHAM PROVINCIAL LABORATORY

METABOLIC DISEASES AND CHEMISTRY

The Metabolic Diseases Laboratory screens for certain disorders of metabolism and endocrine function in the newborn, while the Chemistry Laboratory conducts reference diagnostic and public health biochemistry according to selected parameters.

Program Findings

This year the newborn screening program detected three cases of primary hypothyroidism (one iodine trapping defect) and one case of pituitary hypothyroidism; six galactosemia variants; one cystinuria; one congenital adrenal hyperplasia (from a pilot study) and one histidinemia. The cases of hypothyroidism would have gone on to develop varying degrees of mental impairment had they not been detected at birth and put on treatment. Three of the galactosemia variants are on low galactose diets and the case of cystinuria is on a low cystine diet. Cases of cystinuria if undetected often develop urinary calculi and possible renal impairment later in life. Calculation of our program costs compared to anticipated costs averted indicate a consistently high cost/benefit ratio. Since 1979 a total of 23 cases of primary hypothyroidism and eight phenylketonurias alone were detected through screening. If 40% of these required institutionalization for an average life span of 50 years and an average yearly cost of custodial care of $40,000/case, the cost benefit ratio would be:

40% of 31 = 12 cases;
Costs averted = 12 x 50 x 40,000 = 24 million
Total annual screening costs (1985-86) = $400,000
Program costs (1979-86 = $400,000 x 8 = 3.2 million
Savings = $20.8 million Cost/benefit ratio is 8:1

During the year Dr. Fox prepared a review of the Manitoba newborn screening program for the twenty year period 1965-1985.

Maternal serum alpha-feto protein was provided for requesting physicians and has reached a volume of $\geq$500 tests per month.

The newborn urine collection card and descriptive brochure were reprinted incorporating changes to make the instructions on proper urine collection more explicit.

Research and Development

The development and evaluation of an assay for 17-hydroxyprogesterone was completed and a normal range determination was undertaken. While performing the normal range study a case of congenital adrenal hyperplasia was detected in a male infant born in a rural area. As many affected males go undetected at birth and may go on to die with

the Salt Losing Syndrome, it is quite possible that this baby's life was saved by this finding.

Research and development was completed on the biotinidase assay and this very inexpensive additional procedure was incorporated into the routine blood testing menu. This assay provides yet another tool for the detection of an inborn error of metabolism that can result in serious neurologic damage if not diagnosed and treated promptly. The metabolic defect lies in an inability to efficiently metabolize the vitamin biotin. Simple inexpensive replacement therapy with biotin is all that is required to maintain health.

The section instituted an assay for glycated hemoglobin (GHB) using the affinity column technique and venous blood sample. The section is cooperating with Diabetes Education Resource groups in making this assay readily available to physicians in their region. Research is still in progress to successfully adapt the assay to a dried blood sample on a filter card. The goal is to provide the diabetic patient with a filter card for sample collection similar in nature to the one employed in collecting blood from newborns. The patient would collect finger prick blood on the card and mail it back to the laboratory. The laboratory would then analyze the specimen and report the GHB value to the patient's physician who would then have a result on hand to coincide with the patient's next visit thereby facilitating better patient management. The section has produced an information leaflet for physicians which details the nature of GHB, the indications for testing, the limitations of test assays, reference values and interpretation of results obtained.

The laboratory cooperated with the City of Winnipeg and Provincial Entomologists in making a pseudocholinesterase assay available to field workers engaged in the application of insecticides during the mosquito season.

Also, in the sphere of public health chemistry, the section had its algorithm on cholesterol testing professionally printed on stiff paper in envelope size. The algorithm has been distributed to a large number of rural physicians and we are presently in the process of evaluating its effect on physician test ordering practises. The laboratory's goals in this activity include standardization of assay values at the CPL and LAXUS units, adoption of age adjusted normal ranges, the orderly selection of tests on initial investigation and the acceptance of periodic lipid measurements as an essential component in the control of coronary heart disease. The laboratory well realizes that physician and public education are the keystone in the control of this risk factor. Patient management regimes by dietary or drug protocols must be available to the physician who has to interpret and act on test values. To this end, the laboratory is working to align its efforts in concert with the Department of Health, the Manitoba Heart Foundation and the MMA.

RURAL LABORATORY AND X-RAY UNITS

LABORATORY: EASTERN REGION

The Laboratory services at the Rural Laboratory Units include a range of chemistry, hematology, coagulation, blood banking, urinalysis and microbiology tests.

Quality Control Programs

The Division continues to monitor and ensure quality of laboratory analysis by participating in the following internal and external Quality Assurance Programs:

Those offered by the Quality Control Section of the Cadham Provincial Laboratory:

a) A Quality Control program for monitoring pregnancy testing and infectious mononucleosis testing.

b) Microbiology - a comprehensive gram staining, sensitivity testing and culture identification Quality Control program for the participating Laboratory and X-ray Units.

Commercial Hematology control cells (internal program on all electronic cell counting apparatus).

The Regional Hematology Quality Control program.

Ames Urinalysis program.

The Fisher Diagnostics "Accutrak" computerized chemistry quality control program monitors internally the chemistry program.

All Units continue to participate in the College of American Pathologist Inter-laboratory Comparison program.

New Activities

The Strep I.D. test has been introduced to the majority of the Laboratory and X-ray Units in the Region enabling rapid and on-site diagnosis of Group A streptococcal infection.

The glucose urea nitrogen serum sodium and potassium testing programs have been updated and improved at Vita, Manitou and Emerson with Kodak DT 60 chemistry analyzer utilizing the dry chemistry principle. This will greatly enhance the turn-around-time for test results, eliminate reconstitution of substrates, and overall is much more compatible with the restricted physical space of the departments.

The Quan T test total protein assay system for the quantitation of cerebrospinal fluid and urine proteins has been introduced. The assay

is based upon the interaction of protein with the dye Cromassie Blue and is an accurate and rapid method for quantitation.

The Boehringer Mannheim (BMC) Urinalysis Chemstrip testing is a valuable testing protocol for our Laboratories. This system allows for leucocyte detection and therefore has reduced the amount of time and resources required to effect a complete urinalysis.

Upgrading of Systems

Electronic cell counter (Hematology) Coulter Electronics T660 with 8 hematological parameter capabilities has been installed at the Gimli, Churchill and Selkirk Units.

Both Selkirk and Morden biochemistry programs received upgrading with the installation of the Hoffman LaRoche Mira analyser. The Mira is a microprocessor-controlled instrument, capable of both batch - or random - access analyses, with a theoretical throughput of 120 tests per hour.

The Electro Nucleonics Gemstar chemistry analyzer has been installed at the Churchill Laboratory. This instrumentation replaces the obsolete manual method for determining the three cardiac enzyme levels and other manual chemistry tests.

Four new flame photometers have been installed at Treherne, Eriksdale, Pine Falls, and Gillam, each capable of serum/urine sodium and potassium analysis.

Some further minor equipment was upgraded which included microscopes, seralyzer test modules, incubators and flow-through refractometers at various locations. BIO-Safety needle disposal containers were placed throughout the rural Units.

Research and Development

The Coulter Electronics T660 Hematology Microcell counter was evaluated at Selkirk.

Microtainers autoclave deodorant beads and microtainer lancets were evaluated at the Morden Laboratory.

The Dupont Ion selective electrode electrolyte analyzer was evaluated at the Morris Laboratory.

The Radiometer Blood Gas equipment distributed by Bach Simpson were demonstrated and studied.

The BMC and Ames Urine Reflectance meters were evaluated at Gimli.

The Lab-Adopt disposable cuvette washer was evaluated at the Portage la Prairie Laboratory.

The Biosafety needle collection receptacles have been evaluated by a number of laboratories throughout the Region.

The Theophylline method and test kits were evaluated at the Portage la Prairie laboratory.

Construction and/or Renovations

Construction/renovations are to begin at Manitou. Currently in construction stage - Whitemouth, Steinbach.

Programs currently at the Functional Program stage are at the following locations: Portage, Stonewall, Beausejour and Vita.

Construction renovations currently at discussion stages are Notre Dame, Sundance, and St. Pierre.

RURAL LABORATORY AND X-RAY UNITS

LABORATORY: WESTERN REGION

During the past year activities were focused on upgrading of equipment, staff, and instrumentation.

The staff at Dauphin are now in a new, spacious laboratory attached to the Hospital. The laboratory includes a staff lounge, lockers, meeting rooms and dedicated office space for supervisory staff. The laboratory is now well-equipped, including state-of-the-art fully automated high through-put hematology and chemistry analyzers. The anlayzers should significantly reduce stress associated with handling large volumes of patient samples using manual or semi-automated techniques.

The new laboratory at Neepawa is now in operation. A microbiology laboratory and a fully automated chemistry analyzer have been included in the new facility.

To improve local service, various test procedures have been added to the "menu" at The Pas, Flin Flon, Swan River, Killarney, Virden, Hamiota, Minnedosa, and Lynn Lake. An emphasis was placed on such procedures as therapeutic drug monitoring and qualitative toxicology investigations.

Laboratories performing a limited scope of chemistry test procedures were equipped with analyzers applying the latest technology, whereby a pre-measured quantity of blood serum is placed on a slide which is then placed in the analyzer and the test result is displayed on a screen or printed on a strip of paper. Time per test varies between three to five minutes.

Safety centrifuges with aerosol containment and safety locks were placed in 13 laboratories throughout the region.

Upgrading of chemistry and hematology analyzers at Flin Flon, McCreary, and Rivers was accomplished.

Staff from Swan River and Dauphin attended seminars at the Cadham Provincial Laboratory and the Red Cross.

RURAL LABORATORY AND X-RAY UNITS

RADIOGRAPHY, ELECTROCARDIOGRAPHY, AND ULTRASOUND: EASTERN REGION

Planning and Construction

Functional programs have been completed for new radiographic services at the Portage la Prairie, Stonewall, St. Pierre and Vita Hospitals.

Architectural drawings are completed for the new Manitou Lab and X-ray Departments.

New facilities are currently under construction at the Steinbach and Whitemouth Hospitals.

Construction was completed at the Gillam and Pine Falls hospitals and staff have now moved into the new facilities.

Capital Equipment Purchases

The Morden X-ray Department was equipped with a new radiographic/fluoroscopic suite. The department now has a Raytheon RMX 625 R/F table, closed circuit T.V., wall bucky and Automatic Exposure termination devices.

Similar radiographic/fluoroscopic equipment was installed in the new facility at Pine Falls. Also included was an AFP 14XL film processor.

In conjunction with the new Gillam Hospital construction program, the x-ray department was equipped with a radiographic table, a 500 mA Elscint generator, wall bucky, automatic exposure termination devices and an AFT 14XL film processor.

The Pinawa Unit x-ray table was upgraded to a new Elscint R/F table with spot film device.

Film processors were purchased for Notre Dame, MacGregor, St. Claude, and Emerson as part of a program to upgrade all manual processing units.

Product Assessment

Film comparison testing was conducted in January 1987. Products assessed included: Fuji RXOG, Fugi HR, Klodak OG, Konica MG and Konica MGH X-ray film. The products were tested for base plus fog, Maximum Density, Characteristic Curves, Mottle, line pair resolution and relative film contrast.

Numerous radiographic, fluoroscopic and ultrasound equipment manufactured by Elscint, CGR, Raytheon, and Siemens were assessed in preparation for purchase of equipment for the Steinbach Hospital.

The Burdick E500 electrocardiograph machine was assessed at the Selkirk Lab & X-ray Unit.

RURAL LABORATORY AND X-RAY UNITS

RADIOGRAPHY, ELECTROCARDIOGRAPHY, AND ULTRASOUND - WESTERN REGION

Ongoing Programs

The radiography department Health and Safety Manual was revised and distributed to all departments in June of 1986, following ratification by the Supervisors' Advisory Committee. This in-house document provides guidelines on safety as it pertains to radiation protection, infection control, electrical hazards and general health and safety. The main areas of revision included changes to the maximum permissable radiation exposure rates, and methods of reporting to meet new Federal and International standards as well as refinements to the infection control procedures.

Seventy-two pieces of equipment were surveyed in the western region. These included all sizes of mobiles, radiographic units, radiographic/fluorescopic suites, two O.R. suites, and one Panorex dental unit. A main focus of attention is aimed at reducing high fluoroscopy exposure rates. Part of the survey reports on selected patient examination techniques and the resultant of radiation exposure and film density and compares these factors to the provincial averages. A number of our departments compared very favourably to provincial averages.

The Preventative Maintenance Program for the electrocardiograph units continues in the western region with periodic safety and electrical inspections being carried out on a 12-18 month frequency. In the past year, 25 units have received an inspection service.

Quality assurance is expanding in the services in tandem with the development of the programs in the individual hospitals. Therefore, the departments are at various stages of audit procedures and reports for patient care, personnel practices, administration and operation practices, volume indicators and quality indicators.

New Programs

In late 1985, the Provincial Laboratory and X-ray Services Division's Policy and Procedures Manual was introduced and distributed across the Province. Introduction of this Manual has been well received by our technologists and numerous hospital administrations across the Province. The continual development of this Manual will also be an ongoing long-term enterprise.

A policy statement advocating an Incident Report Form and procedure was approved by the Supervisors Advisory Committee and was introduced to the service in December of 1986. The Incident Report is intended to facilitate documentation of any unusual work-related events in the Lab and X-ray departments.

A new method of radiography film handling and processing (Dupont modular daylight load systems) was first introduced into the Provincial Laboratory and X-ray Services Division in early 1986 at Neepawa and The Pas. The daylight load system allows for a more efficient use of space, and film processing, and reduces the patient's examination times.

Product Evaluations

Field trials were carried out on the Litton EK41 Cardiotest single channel electrocardiograph, and EK43 Multiscriptor three channel electrocardiograph units marketed by Overseas Monitor in Carberry, Gladstone, and Neepawa.

A Konica Model QX-60A counter-top type automatic x-ray film processor was evaluated in the Swan River department.

A film evaluation and comparison trial was carried out in Killarney. Fuji type HR-G and Konica MG films were compared with our currently used Fugi RXO-G. A summary of the film comparison tests was written up by the Regional Supervisor.

Evaluations on the Burdick Model E-500 and Model E-600 electrocardiograph machines commenced in March 1987, in Dauphin and The Pas. Both incorporate computer interpretation, a digitized signal for electronic storage, and telephone transmission of EKG signals or records. This type of equipment has a totally new printing system and has eliminated single and multi-channel galvanometers.

Capital Equipment Purchases

Swan River began operations with their new Raytheon radiographic/fluoroscopic suite in early March of 1987. The new system consists of a single-phase Raytheon RMX-625 generator, RMS 90-15 table with linear tomography and closed circuit TV system.

Planning and Construction

Activities in the early part of 1986/87 in construction plans continued at the same high rate as was experienced in the previous fiscal year. No new projects were added this year. Departments still in various stages of planning and construction are Flin Flon, The Pas, Swan River, Benito, Grandview, Erickson, Minnedosa, Souris, Virden, and Wawanesa.

Grandview is the only site of active construction at this time. Gilbert Plains Personal Care Home, which included a basic radiographic room was the only construction project completed in 1986/87.

LAB MEDICINE EDUCATION

GENERAL:

Laboratory Medicine Education (LME) is administered and co-ordinated from the Cadham Provincial Laboratory for the entire Division by the Co-ordinator of LME.

Continued use was made of distant educational programs acquired from various sources. These programs consist of a text, visual slides, and an audio tape. Each program covers a specific topic related to laboratory medicine and may run up to one hour. The programs can be studied by individuals or in groups, at minimum cost to the Division, and at maximum convenience to the participants. During the year, 36 staff utilized these programs.

In order to facilitate the use of these and other resources, a catalogue of CE-Resources available to our technologists was developed, produced and placed at each workplace.

Dr. Williams, and invited specialists, continued the Division's on-site visitations. While at these visits, formal and informal presentations are delivered to rural physicians, technologists, auxiliary staff and the public. Fifty-eight such presentations were made on topics such as: "Street Drugs", AIDS Update, Respiratory Infections, Antibiotic Audits, Diabetes, "Newer Vaccines", "Cholesterol" and "Panic Values". In all, 349 individuals attended: 161 physicians, 84 technologists, and 104 others. The Division is highly appreciative of the contributions made by the visiting specialists.

LABORATORY ASSISTANTSHIP TRAINING

The Division continued to conduct a 12-week program to train selected Registered Radiological Technologists in basic laboratory medicine. In this program candidates receive six weeks intensive didactic training followed by six weeks of guided practice in one of our rural Units. During the year the objectives of this program were reviewed and a revised Syllabus was approved by the College of Physicians and Surgeons. The didactic part of the program was again carried out at the Teulon Health Centre in order to free space at the Cadham Laboratory. Five candidates graduated from this program. We are indebted to Myrla Smederovak and Pat Bird, who conducted a large part of the didactic program, and to the staff of the Teulon Health Center, who assisted us in finding accomodation for our students and made us feel like welcome guests.

INSERVICE TRAINING:

This area of training is categorized in six distinct formats:

1. Reviews on routine procedures by on-line staff, particularly to new staff and to summer students.

2. Introduction of new tests or instruments. This may involve:

   a. Familiarization by a sales representative or senior staff.
   b. A pre-test as a guide to basic relevant knowledge.
   c. Practice under supervision and guidance of an instructor.
   d. A practical test to demonstrate procedural competence.
   e. A post-test to demonstrate an understanding of principles, applications and pitfalls.

3. Lectures or seminars presented by senior staff or invited guests. These are usually broad topics of interest to all or several laboratory sections.

4. Presentation and review of current articles by designated staff members.

5. Short programs that are sent to individuals or groups, and that can be learned on-site without help from an Instructor.

6. Formal programs that require indepth involvement and longer time commitments from both the participant and an instructor - e.g., re-training staff.

Specific activities under categories 2, 3, and 4 are listed below. The numbers in brackets represent the number of staff in attendance at the respective session. All were one hour each unless otherwise indicated:

CPL SEMINARS:

Diabetes Screening - Dr. D. Gelskey	(23)
Diagnostic Tests for Chlamydia - Dr. T. Williams	(26)
HTLV-III Virus Infections - Dr. M. L. Rekart	(97)
CNS Infections in Manitoba - Dr. G. Hammond	(27)
Detection of Human Papillomavirus - Dr. P. McNicol	(31)
Community Health Assessment - Dr. R. Musto	(29)
Test Utilization and Medical Education - Dr. G. Hammond	(34)
Future Directions in Chronic Disease Epidemiology - Dr. I. Johnson	(30)
Public Health Applications of Mutagen Screening - Dr. A. Maniar	(26)
Taking the X out of X-ray - Mr. M. Burroughs	(27)

OTHER CPL SESSIONS:

Nine Journal Reviews - Various Staff Members	(216)
Seven Research Reviews - Various Staff Members	(147)
Three Safety Seminars - A. Delaat (two hours)	(34)
Safety Elements in Laboratory Practice	(32)

RURAL SESSIONS:

Urine Microscopy - Various Locations (1 1/2 hr)	(11)
Urinalysis by Correspondence - Various Locations (2 hr/lesson)	(8)
Misc. - Slide Tape Topics, etc. - Various Locations (1 hr/show)	(154)
Stress of Hospitalization - Various Locations (2 hr)	(15)
Hemophilia - Portage (1 hr)	(9)
Hemophilus ducreyi - Flin Flon (1 hr)	(2)
Fire Safety - Dauphin (1 hr)	(3)
Tools of Statistics - Flin Flon (30 hr)	(1)
Death and Dying - Flin Flon (2 1/2 hr)	(1)
Transportation of Dangerous Goods - Flin Flon (2 1/2 hr)	(7)
Computer Systems - Portage (2 hr)	(1)
St. John's Firt Aid - Churchill	(6)

EXTRAMURAL TRAINING FOR THE DIVISION:

Several staff members received assistance to partake in extramural training programs, or supported themselves in such activities:

Hepatitis B Vaccination - Lecture - Winnipeg (1 hr)	(26)
Visitation Westman Laboratory - Brandon (1 d)	(11)
Crossmatching Update - CRC - Winnipeg (2 d)	(3)
CPR - Workshop - Various Locations (6 hr)	(18)
Clin. Micro. - Correspondence - TMIT (30 hr)	(5)
Cobas Miras Workshop - Brandon (6 hr)	(10)
Immunohematology Update - SAIT (30 hr)	(3)
Quality Assurance - Portage (1 1/2 hr)	(10)
Laboratory Update - The Pas - SAIT (30 hr)	(1)
Advanced Hemostasis - Flin Flon - SAIT (30 hr)	(1)
CSLT - National Congress - St. John's (5 d)	(4)
ECG-Interpretation - The Pas, Churchill (3 d)	(2)
Clin. Chemistry - Correspondence - SAIT (30 hr)	(1)
Hematology - Correspondence - TMIT (30 hr)	(1)
CSLT - Telenars (1 hr/Tel)	(18)
Microbial Serology and Genetics - U. of M. (30 hr)	(1)
72^{d} Assembly - Radiological Society NA (5 d)	(1)
Ames Seralyzer Seminar - Selkirk (1 d)	(3)
6th International Neonatal Screening Symposium - Austin, TX (4 d)	(1)
Post-Grad. - Med. Lab. Course - Brandon (2 d)	(53)
Agassiz Academy - Portage (2 1/2 hr)	(8)
Academy Action - Winnipeg (2 d)	(26)
DNA Hybridization Course - Dr. P. McNicol - CPL (2 d)	(8)

Legend:

U. of M. - University of Manitoba
CSLT - Canadian Society of Laboratory Technologists
ASM - American Society of Microbiology
SAIT - Southern Alberta Institute of Technology
TMIT - Toronto Institute of Medical Technology

EXTRAMURAL TEACHING FROM THE DIVISION:

A number of our staff continued to contribute a significant amount of their time to teaching at the University of Manitoba Medical and Dental Faculties. These activities include lectures, seminars, tutorials, rounds and laboratory sessions in a variety of health-related programs.

Some entire courses are coordinated by Division staff:
Clinical Parasitology - 97:714 - Faculty of Medicine, Dr. L. Sekla - Coordinator and Instructor.

Clinical Virology - 97:713 - Faculty of Medicine, Dr. G. Hammond - Coordinator and Instructor.

Radiology 103.114 - Faculty of Dentistry and Radiology 70:212 - School of Dental Hygiene, Dr. D. Gelskey - Coordinator and Instructor.

Two graduate students are being supervised by our staff:

Mr. T. Scott-Taylor, Ph.D. student, by Dr. Hammond
Mrs. R. Kilani, Ph.D. student, by Dr. Sekla

Lab rounds are a weekly feature at the CPL, and review the medical use of diagnostic technology, specimen collection, and test interpretation. Twenty-one rounds were conducted at the CPL for infectious disease fellows, residents, interns and medical students. The rounds were presented by: Messrs. Stackiw, Klisko, Koschik, Ahluwalia, Barker, Milley and Kan, Drs. Maniar and McNicol , Mrs. Eibisch, Dzogan, Winther, Giercke, and Miss Pugh.

Several other graduate students rotated through various departments of the CPL for varying periods of time:

Dr. G. Sheehan - Virology - 6 weeks
Dr. B. Conway - Infectious Disease Schedule - 1 month
Dr. J. Odumera - Clinical Microbiology - 6 weeks
Dr. A. Roberts - Community Medicine Rotation - 1 month

Fifty Water and Waste students visisted the CPL, focusing on Environmental Microbiology. Conveners were Mr. Stackiw, Mr. Milley, Ms. Pugh, and Mrs. Winzinowich.

Two Red River Community College Instructors received upgrading in Virology, Clinical Microbiology and AIDS testing.

Three "Open Houses" were conducted at the Portage and Swan River Laboratories, and at the CPL, while Science Fair students and student nurses paid visits to the Laboratory at The Pas.

Many other presentations were delivered to outside groups. Some of the more noteworthy were:

Coogan, L.
Manual WBC and Platelet Counts
NWT Zone Nurses Conference, Churchill

Delaat, A. N. C.
Laboratory Acquired Infections
Manitoba Agricultural Centre, Winnipeg (27)
Rh Laboratory, Winnipeg (15)
Rh Institue, Winnipeg (23)

Ibid -
Proposal Writing
Manitoba Association of Social Workers, Winnipeg

Ibid -
Written Communications Workshop - 2 x 4 d
Civil Service Commission - Manitoba - Winnipeg

Gelskey, D.
Advances in Dental Radiography
Manitoba Dental Nurses Assocation - Portage la Prairie

Ibid -
Community Based Health Promotion Planning
Interlake health Unit Advisory Board

Ibid
Community Based Health Promotion Planning Workshop
Interlake Health Unit Staff

Hammond, G. W.
AIDS Virus Infections - Laboratory Diagnosis and Current Status of Virus Spread in Manitoba and Canada.
Canadian Medical Association, Westin Hotel, Winnipeg, August 13, 1986

Ibid -
Acute CNS Infections
Department of Medicine, University of Alberta Hospital, Edmonton, Alberta, Feburary 26-27, 1987

Ibid -
Acute Bacterial Meningitis
Concordia Hospital Medical Education Rounds, Winnipeg, March 5, 1987

Ibid -
Influenza Intervention: Prevention, Management, and Control in High Risk Patients
Holiday Inn, Winnipeg, December 4, 1986

Jones, N.
Blood Grouping
Swan River P.C.H. - Staff and Students - Swan River

Kindrat, E.
Blood Components
Swan River Public School, Swan River

McNicol, P.
Human Papillomavirus - Oncogenic S.T.D.
Canadian Society of Laboratory Technologists
Academy Action, Winnipeg

Milley, D.
Bacteriology I and II
Water and Water-Waste School, Winnipeg

Sekla, L.
Hepatitis and Hepatvax B
Red Cross, Winnipeg, April 2, 1986.

Ibid -
CPL Serology, Parasitology
Mount Carmel Clinic, September 1986.

Ibid -
Parasites in Manitoba. Topics related to Serology and Environmental Microbiology.
Tour of some Lab & X-ray with Dr. T. Williams, May 1986.

Ibid -
Cryptosporidiosis in Manitoba
Gastroenterology Rounds, 1986.

ABSTRACTS PRESENTED FROM THE DIVISION:

1. Artsob, H., Spence, L., Bishai, F., Sekla, L., and Kurjanczyk, L. ELISA Surveillance for Western Equine Encephalitis Virus Activity in Canada. Presented at CACMID Conference, Quebec City, November 1986.

2. Hammond, G. W., Mauthe, G., Lukes, H., Thompson, L., Fischer, K., and Hannan, C. DNA Hybridization for the Detection of Enteric Adenoviruses 40 and 41. Presented at the V-International Conference on Comparative Virology, Lake Louise, Alberta, May 6, 1986.

3. Hannan, C., Hammond, G., Yeh, T., and Mauthe, G. An evaluation of DNA hybridization for the diagnosis of adenovirus enteric infection. Presented at the V-International Conference on Comparative Virology, Lake Louise, Alberta, May 6, 1986.

4. Embree, J., Ahluwalia, G., McNicol, P., Law, B., and Hammond, G. Direct Comparison of Nasopharyngeal Aspirate (NPA) and Nasal Swab (NS) for RSV Diagnosis by Tissue Culture, Indirect Immunofluorescence Assay and ELISA. Presented at:

   - 54th Conjoint Meeting on Infectious Diseases, Quebec City, November 24-26, 1986.

   - Interscience Conference on Antimicrobial Agents and Chemotherapy, New Orleans, Louisiana, 1986.

5. Matusik, R. J., McNicol, P., and Spence, A. M. Structure and expression of a gene which is androgen- and zinc-regulated in rat prostate. Presented at the UCLA Symposium - Steroid and Hormone Action, Park City, Utah, 1987.

6. Sekla, L., Stackiw, W., Eibisch, G., and Johnson, I. Measles outbreak in a vaccinated community: evaluation of serodiagnosis. Presented at CACMID Conference, Quebec City, November 1986.

PUBLICATIONS FROM THE DIVISION:

1. Aoki, F., Sitar, Milley, C., Hughes, H., Sekla, L., Sheppard, X., Stiver, H., Hammond, G., Ver Meersch, G., Cooper, T., Lamontagne, H., and Callow, K. Potential of Influenza vaccine and Amantadine to prevent Influenza A illness in Canadian Forces personnel, 1980-1983. Military Medicine, 151:459-465, 1986.

2. Artsob, H., Spence, L., and Sekla, L. Arbovirus activity in Canada, 1985. CDWR Vol. 12-25, June 21, 1986.

3. Burroughs, M., Editor, Divisional Newsletter, Four Issues, MHSC - Winnipeg, 1985-1986, with contributions from:

   i) Sekla, L., Stackiw, W., and Dzogan, S. Pseudomonas aeruginosa. Provincial Laboratory and X-ray Newsletter, June 1986.

   ii) Sekla, L. Blastocystis hominis. Provincial Laboratory and X-ray Newsletter, September 1986.

4. Chernesky, M., Mahoney, J., Castiriciano, S., Sekla, L., Bishai, F., and Vas, S. Diagnostic significance of Anti HBc IgM prevalence related to symptoms in Canadian patients acutely or chronically infected with Hepatitis B virus. J. Med. Virol., 20:269-277, 1986.

5. Fox, J. G. Pamphlet on Diabetes Mellitus and Glycated Hemoglobin MHSC - 1986

6. Fox, J. G. Twenty years experience with screening for errors of metabolism in the newborn in Manitoba. Manitoba Medicine, 57:31-33, 1987.

7. Mann, E., Sekla, L., Nayaer, G., and Koschik, C. Infection with Cryptosporidium spp. in humans and cattle in Manitoba. Med. J. Vet. Res., 50:174-178, 1986.

8. Mann, E., and Sekla, L. Cryptosporidiosis in Manitoba. Can. Med. Assoc. J., 135:1072, 1986.

9. Mann, E., Sekla, L., and Eibisch, G. Cryptosporidium antibodies in Manitoba Cattle: A pilot study using an indirect fluorescent antibody procedure. Canad. Vet. J., 28:126-128, 1986.

10. McNicol, P. J., Albritton, W. L., and Ronald, A. R. Transfer of plasmid-mediated ampicillin resistance from Haemophilus to Neisseria gonorrhoeae requires an intervening organism. Sex Trans. Dis., 13:145-150, 1986.

11. Sacks, S. L., Portnoy, J., Lawee, D., Schlech, Walter III, Aoki, F. Y., Tyrrell, D. L., Poisson, M., Bright, C., Kaluski, J., and the Canadian Cooperative Study Group* (*includes Dr. G. Hammond). Clinical course of recurrent genital herpes and treatment with Foscarnet cream: results of a Canadian multicentre trial. J. Infec. Dis. 155(2):178-186, 1987.

12. Sekla, L., and Parker, S. Legionellosis: a review with special emphasis on water isolations and Manitoba data. Environmental Health Review, 30:67-69, 1986.

VISITS TO OTHER LABORATORIES:

Mr. G. Ahluwalia. Detection of HIV - Dr. M. Wainberg's laboratory
Jewish General Hospital, Montreal

- LCDC Ottawa, September 1986

Dr. G. Hammond visited the laboratory of Dr. D. Ward, Yale University in August 1986, to learn biotinylation of nucleic acids for use in hybridization reactions.

VISITORS FROM OTHER LABORATORIES:

Dr. M. L. Rekart, Director of the Division of Venereal Diseases, Ministry of Health, British Columbia, May 20th, 1986.

Dr. M. O'Shaughnessy, Laboratory Centre for Disease Control, Ottawa, May 28, 1986.*

Dr. P. W. A. Mansel, Deputy Department Chairman/Professorship of Clinical Cancer Prevention, Department of Cancer Prevention, M. D. Anderson Hospital, Houston, Texas, May 29, 1986.*

Dr. W. E. Rawls, Professor of Pathology, Co-ordinator, Cancer Research Group, Department of Pathology, McMaster University, Hamilton, Ontario, November 5, 1986.*

Dr. D. S. Fedson, Associate Professor of Internal Medicine, Head, Division of General Medicine, University of Virginia School of Medicine, January 15 and 16, 1987.*

Dr. M. Osterholm, State Epidemiologist and Chief Acute Disease Epidemiology Section, Minnesota Department of Health, February 19, 1987.*
Dr. R. Tight, Chief, Division of Infectious Diseases, Department of Medicine, University of North Dakota, February 19, 1987.*

Dr. L. Mandell, Chief, Infectious Diseases, McMaster University Medical Centre, Hamilton, Ontario, March 18, 1987.*

* In conjunction with visits to the University of Manitoba.

VOCATIONAL GUIDANCE:

Various staff members participated in career day activities at a number of high schools throughout the Province and at Regional Career Symposia, Winnipeg, Dauphin, Portage, and Stonewall. Career guidance was also provided to various staff members, summer students, and to one Pre-Med student who spent four days at the CPL.

Dr. A. Maniar and Mr. A. Delaat served as judges at the Manitoba Schools Science Symposium finals in May, 1986.

SAFETY:

Twenty-one safety inspections were conducted in LAXUS Units.

EDUCATION - RADIOLOGY

R. T. Training

The Manitoba Health Services Commission X-ray Training School continued its program of training candidates for Registration with the Canadian Association of Medical Radiation Technologists. The program involves 25 months of X-ray training plus three months of Laboratory Assistant Training.

During the 1986/87 fiscal year, three candidates were successful in passing the registration examination, and three senior students were successful in their clinical experience in both rural and city hospitals.

The five junior students enrolled in the theoretical portion of the program at Red River Community College, remain in training and are doing exceptionally well.

The program is now in its third year since its revision. It consists, of two, four month theoretical blocks at RRCC, separated by one month of clinical experience in the hospitals. Final theory is followed by return to the hospitals for the final block of clinical practice to the end of 25 months. The program revision has met with the approval from both students and staff.

X-ray Assistant Training

The Laboratory and X-ray Unit Systems sponsor selected Registered Medical Laboratory Technologists in a four month X-ray Assistant Training Program. This course is designed to train individuals to assist Radiological Technologists in covering emergency call-back situations in smaller rural hospitals.

Three students successfully completed the 1986 program.

Reinstatement Training

The Canadian Association of Medical Radiation Technologists requires any Radiological Technologist, who has been out of active practise in the Radiography field for more than five years to undergo an upgrading program prior to being reinsated as an active radiographer. The training is on-the-job clinical experience under R.T. supervision, coupled with a program of self-study of textbook and audiovisual programs.

The program duration is eight to sixteen weeks, depending upon the length of time the candidate has been inactive in the field.

In 1986, two candidates were successful in the Reinstatement Training Program in rural Manitoba.

Inservice Education

A number of inservice seminars and workshops as well as extramural lectures and conferences were attended by Divisional staff.

The following topics were covered at the respective locations with the figures in brackets representing the number of individuals in attendance.

Radiography

Selkirk

Quality Assurance Testing of Fluoroscopy	1 day	(9)

Wasagaming

M.A.M.R.T. Conference - several topics	2 days	(7)

Calgary

C.A.M.R.T. Conference and X-ray Instructors Seminar - numerous topics	7 days	(1)

Chicago

RSNA Conference - numerous topics	3 days	(1)

Audio/Visual Programs

"immobile Trauma Patient"	Approx. 4 hrs.	(15)
"Christensen Series" - many topics	Approx. 6 hrs.	(12)

Also, several technologists are working on, or have completed correspondence courses through their professional association. The topics include: Quality Control (3 Sections); Pathology (3 Sections); Sectional Anatomy (2 Sections).

Ultrasound

Winnipeg

Seminar - several topics	1 day	(3)

Electrocardiography and Related Topics

Winnipeg

-Burdick ECG interpreter Instrument	2 hours	(8)
-Burdick ECG Seminar	1 day	(1)
-Cardiology Association Teaching Seminar	3 days	(2)
-Holter monitors	1/2 day	(3)

Virden

C.P.R. Heart Saver Course	1 day	(4)

INFECTION CONTROL PROGRAM - LONG TERM CARE FACILITIES AND RURAL HOSPITALS

Seventy-nine continuing education sessions were conducted throughout the province by Miss Phippen. Attendance totalled 1250 and a variety of topics were addressed, AIDS being the most frequently requested.

Two-day training programs were provided on five occasions for 31 hospital employees and 52 long term care employees.

Five issues of "Mighty Microbes" were distributed.

Miss Phippen addressed the Hamilton and District Infection Control Seminar in Hamilton, Ontario on the topic of "Setting up Infection Control Programs in Personal Care Homes". She completed the Certificate Course in Infection Control in Health Care at the University of Manitoba, the Control Service Technical Training Course from Purdue University and the Infant-Child CPR Course.

MANITOBA ADVISORY COMMITTEE ON INFECTIOUS DISEASES (MACID)

The Manitoba Advisory Committee on Infectious Diseases (MACID) meets monthly to address communicable disease issues throughout Manitoba, and brings together individuals from the Department of Health, University of Manitoba, major teaching hospital infectious disease programs, the City of Winnipeg, Federal Health individuals and the Cadham Provincial Laboratory. Items discussed in 1986/87 included:

1. "Review of Diagnostic and Public Health Protocol for Chlamydia trachomatis, including a Discussion of Chlamydiazyme Technology," presented by Dr. M. Fast, Director, Manitoba Communicable Disease Control, Dept. of Health, and Dr. T. Williams, Assistant Director, Cadham Provincial Laboratory, April 24, 1986.

2. "Streptococcal Infections in Manitoba", presented by Dr. Barbara, Pediatric Infectious Diseases, Infectious Disease Section, University of Manitoba, June 5, 1986.

3. "Measles Update", presented by Dr. M. Fast, Director, Manitoba Communicable Disease Control, Dr. I. Johnson, Epidemiologist, Communicable Disease Control, Dept. of Health, and Dr. D. Luckhurst, City of Winnipeg Health Department, October 2, 1986.

4. "Manitoba AIDS Virus Infection Study (MAVIS): Update and HIV Subcommittee Report," presented by Dr. G. Hammond, Chairman, MACID Committee, Director, Laboratory & X-ray Services Division, M.H.S.C. November 6, 1986.

5. "Influenza Virus Surveillance and Control Program," presented by Dr. M. Fast, Director, Manitoba Communicable Disease Control, Dept. of Health, and Dr. G. Hammond, Director Laboratory & X-ray Services Division, M.H.S.C., December 4, 1986.

6. "Should Giardia and Cryptosporidium Infections be Reportable Communicable Diseases", presented by Dr. L. Sekla, Assistant Director, Cadham Provincial Laboratory, Dr. M. Fast, Director, Manitoba Communicable Disease Control, Dept. of Health, February 5, 1987.

7. "Hepatitis B Immunization of Health Care Personnel", presented by Dr. L. Poffenroth, March 5, 1987.

TABLE I

CATHAM PROVINCIAL LABORATORY

WORKLOAD STATISTICS
1986/87
With Comparison to 1985/86

SECTION	1985/86 NO. OF SPECIMENS	1985/86 NO. OF TESTS	1985/86 STATISTICS CANADA UNITS	1986/87 NO. OF SPECIMENS	1986/87 NO. OF TESTS	1986/87 STATISTICS CANADA UNITS
Clinical Microbiology	103,975	130,025	1,952,631	107,304	134,943	2,210,694
Media	-	-	334,130	-	-	353,544
Virus Detection	13,845	19,324	723,328	14,369	19,880	738,041
Environmental Microbiology	47,579	78,645	1,581,229	46,960	80,050	1,536,175
Serology/Parasitology	109,461	249,387	3,630,901	105,940	230,750	3,571,530
Metabolic/Chemistry	53,862[1]	189,399	1,006,236	60,678	210,934	1,155,353
CPL TOTAL	328,722	666,780	9,228,455	335,251	676,557	9,565,337

1. 1985/86 no. of specimens was incorrectly reported in last year's report. This figure is adjusted to reflect the actual number of specimens received.

WORKLOAD OF RURAL LAB. & X-RAY UNITS SYSTEM - APRIL 1ST, 1986, TO MARCH 31ST, 1987

UNIT	X-RAY EXAMINATIONS			X-RAY S.C. UNITS			LAB S.C. UNITS			ECG EXAMS		
	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT
RUSSELL	3,255	602	3,653	115,329	27,823	87,506	189,651	77,183	112,468	863	361	502
BIRTLE	2,195	467	1,728	71,272	18,536	52,736	212,111	69,997	142,114	1,042	425	617
ROSSBURN	1,179	297	882	31,193	10,452	20,741	95,758	38,000	57,758	410	180	230
SIOUX LAKE	1,417	365	1,052	34,768	10,206	24,562	170,681	60,539	110,142	571	274	297
DAUPHIN	16,889	3,725	13,164	723,905	171,747	552,158	1,277,194	450,542	826,652	6,423	2,128	4,295
GILBERT PLAINS	464	31	433	10,560	890	9,670	47,826	7,390	40,436	178	10	168
GRANDVIEW	1,304	159	1,145	31,910	5,552	26,358	95,487	22,170	73,317	423	84	339
MCCREARY	1,233	139	1,094	31,038	4,150	26,888	81,136	23,747	57,389	314	68	246
ROBLIN	3,305	960	2,345	91,094	31,225	59,869	303,741	129,192	174,549	1,275	659	616
STE. ROSE	5,886	1,503	4,383	154,963	46,707	108,256	448,981	213,042	235,939	1,361	612	749
WINNIPEGOSIS	1,269	403	866	31,341	11,163	20,178	80,892	46,903	33,989	425	259	166
NEEPAWA	5,677	1,022	4,655	166,606	40,244	126,362	449,985	154,285	295,700	2,266	834	1,432
CARBERRY	1,516	261	1,255	42,525	7,472	35,053	173,367	55,523	117,844	820	219	601
ERICKSON	1,213	305	908	30,668	11,123	19,545	102,275	41,703	60,572	401	172	229
GLADSTONE	1,735	437	1,298	60,344	16,784	43,560	151,361	53,265	98,096	434	196	238
MINNEDOSA	3,054	572	2,482	114,141	22,611	91,530	183,875	77,653	106,222	807	360	447
PORTAGE	12,685	2,659	10,026	448,543	107,368	341,175	1,095,685	381,374	714,311	4,209	1,821	2,388
MACGREGOR	462	63	399	10,852	2,212	8,640	28,340	4,876	23,464	183	41	142
MANITOBA SCHOOL	1,347	1,347	-	32,378	32,378	-	-	-	-	-	-	-
NOTRE DAME	886	262	624	22,306	8,631	13,675	80,329	19,165	61,164	198	87	111
ST CLAUDE	509	128	381	12,799	4,398	8,401	57,116	24,316	32,800	231	83	148
TREHERNE	1,407	174	1,233	57,956	8,035	49,921	154,206	41,385	112,821	317	105	212
KILLARNEY	5,253	941	4,312	175,598	37,975	137,623	359,571	115,911	243,660	1,069	365	704
BALDUR	566	215	351	17,113	8,502	8,611	54,795	28,261	26,534	192	127	65
BOISSEVAIN	1,733	356	1,377	41,526	10,230	31,296	216,608	69,477	147,131	671	212	459
CARTWRIGHT	273	35	238	6,944	1,125	5,819	38,463	8,906	29,557	73	6	67
CRYSTAL CITY	1,724	354	1,370	55,173	11,927	43,246	216,313	70,087	146,276	475	213	262
DELORAINE	2,853	421	2,432	86,577	16,194	70,383	244,914	82,330	162,584	902	317	585
MELITA	2,418	472	1,946	60,586	15,776	44,810	182,210	57,448	124,762	627	295	332
PILOT MOUND	-	-	-	-	-	-	-	-	-	-	-	-
MORDEN	5,373	1,272	4,101	179,832	45,868	133,964	660,497	183,713	476,784	1,404	592	812
ALTONA	3,195	655	2,540	104,349	22,005	82,344	306,291	101,467	204,824	646	208	438
CARMAN	4,726	1,406	3,320	160,184	49,242	110,942	303,384	119,862	183,522	1,089	487	602
EMERSON	1,193	267	926	27,241	6,178	21,063	78,901	26,297	52,604	419	107	312
MANITOU	910	201	709	22,273	5,674	16,599	67,659	19,877	47,782	236	104	132
MORRIS	2,757	566	2,191	74,209	17,013	57,196	270,967	98,383	172,584	984	367	617
SWAN LAKE	3,897	581	3,316	138,510	26,316	112,194	390,992	96,738	294,254	1,318	246	1,072
WINKLER	5,766	1,655	4,111	211,259	48,229	163,030	410,246	207,075	203,171	1,144	802	342
SELKIRK	12,730	1,937	10,793	433,326	69,431	363,895	861,923	300,610	561,313	3,059	1,348	1,711
BEAUSEJOUR	4,438	742	3,696	154,315	30,934	123,381	162,797	116,083	46,714	677	525	152
LAC DU BONNET	1,052	-	1,052	22,507	-	22,507	76,895	-	76,895	318	-	318
PINAWA	1,863	387	1,476	60,662	13,782	46,880	160,387	57,197	103,190	579	336	243
PINE FALLS	2,912	498	2,414	66,893	12,687	54,206	232,028	91,096	140,932	826	336	490
SELKIRK M.H.C.	786	-	786	23,292	23,292	-	18,167	18,167	-	47	47	-
WHITEMOUTH	516	224	292	15,839	8,658	7,181	22,080	13,141	8,939	193	114	79
SWAN RIVER	8,658	1,746	6,912	332,536	67,523	265,013	490,680	192,213	298,467	2,066	768	1,298
BENITO	225	69	156	7,069	2,279	4,790	14,836	6,616	8,220	108	44	64
GIMLI	4,370	722	3,648	148,691	33,094	115,597	331,160	92,125	239,035	1,465	506	959
ERIKSDALE	1,966	270	1,696	58,969	10,342	48,627	101,484	33,732	67,752	229	105	124
RIVERTON	194	-	194	3,984	-	3,984	-	-	-	-	-	-
STONEWALL	3,041	443	2,598	77,557	15,305	62,252	215,873	75,461	140,412	894	233	661
TEULON	3,940	738	3,202	130,145	26,968	103,177	291,873	97,423	194,450	943	323	620
VIRDEN	3,881	586	3,295	126,066	22,146	103,920	307,837	80,049	227,788	1,169	385	784
BRANDON M.H. C.	1,316	1,022	294	25,966	21,879	4,087	-	-	-	-	-	-
HAMIOTA	2,581	514	2,067	74,364	15,174	59,190	321,666	106,398	215,268	1,229	415	814
RESTON	1,050	243	807	28,491	8,720	19,771	89,872	32,790	57,082	390	152	238
RIVERS	1,272	185	1,087	30,660	4,781	25,879	144,877	28,628	116,249	464	70	394
SOURIS	4,186	1,158	3,028	130,658	33,150	97,508	267,509	86,716	180,793	1,125	276	849
ARBORG	2,515	477	2,038	62,113	15,480	46,633	152,598	65,649	86,949	591	354	237
ASHERN	1,381	130	1,251	31,810	3,763	28,047	107,116	29,337	77,779	358	81	277
CHURCHILL	1,862	499	1,363	65,480	16,412	49,068	405,968	122,347	283,621	359	180	179
FLIN FLON	11,796	2,236	9,560	312,708	62,397	250,311	809,051	336,428	472,623	3,176	966	2,210
GILLAM	1,112	243	869	28,292	8,407	19,885	93,136	24,739	68,397	267	107	160
GLENBORO	815	152	663	20,613	5,438	15,175	62,221	15,903	46,318	317	104	213
LEAF RAPIDS	1,088	81	1,007	31,495	3,024	28,471	93,140	12,004	81,136	125	37	88
LYNN LAKE	2,335	377	1,958	73,416	14,457	58,959	131,140	52,963	78,177	346	169	177
ST. PIERRE	3,245	683	2,562	114,566	29,910	84,656	135,324	58,688	76,636	693	324	369
STE. ANNE	4,455	625	3,830	140,630	20,695	119,935	171,289	79,917	91,372	640	275	365
SNOW LAKE	711	23	688	16,481	640	15,841	43,102	5,231	37,871	158	21	137
STEINBACH	7,780	1,342	6,438	297,605	56,194	241,411	646,568	221,441	425,127	2,276	689	1,587
SUNDANCE	391	-	391	8,714	-	8,714	-	-	-	-	-	-
THE PAS	18,777	3,193	15,584	630,912	110,179	520,733	1,103,764	533,034	570,730	3,995	1,458	2,537
VITA	1,273	235	1,038	32,192	6,614	25,578	72,884	25,361	47,523	341	143	198
WANANESA	1,180	188	992	27,223	5,316	21,907	93,715	13,783	79,932	431	78	353

TOTAL LAB S. C. UNITS	-	17,514,818	IN/PAT -	6,303,352	OUT/PAT -	11,211,466
TOTAL X-RAY EXAMINATIONS	-	233,217	IN/PAT -	48,032	UT/PAT -	185,185
TOTAL X-RAY S. C. UNITS	-	7,534,105	IN/PAT -	1,701,032	OUT/PAT -	5,833,073
TOTAL E.C.G. EXAMINATIONS	-	64,254	IN/PAT -	24,395	OUT/PAT -	39,859

TABLE III

LABORATORY AND X-RAY SERVICES UNITS

ULTRASOUND WORKLOAD
1986/87
With Comparison to 1985/86

	1985-1986			1986-1987		
UNIT	TOTAL	IN-PATIENT	OUT-PATIENT	TOTAL	IN-PATIENT	OUT-PATIENT
WINKLER	2,560	190	2,370	2,801	151	2,650
DAUPHIN	2,364	284	2,080	2,498	333	2,165
SWAN RIVER	321	20	301	380	31	349
THE PAS	2,239	323	1,916	2,698	425	2,273
STEINBACH	1,398	123	1,275	1,426	120	1,306
SELKIRK	479	30	449	2,161	134	2,027

TABLE IV

COMPARISON OF WORKLOAD OF RURAL LAB & X-RAY SERVICES UNITS
1985/86 to 1986/87

	1985/1986			1986/1987		
	TOTAL	IN-PATIENT	OUT-PATIENT	TOTAL	IN-PATIENT	OUT-PATIENT
LAB SC UNITS	18,686,670	6,724,392	11,962,278	17,514,818	6,303,352	11,211,466
X-RAY EXAMINATIONS	229,197	47,982	181,215	233,217	48,032	185,185
X-RAY SC UNITS	7,521,665	1,718,306	5,803,359	7,534,105	1,701,032	5,833,073
ECG EXAMINATIONS	63,891	24,951	38,940	64,254	24,395	39,859

TABLE V

CADHAM PROVINCIAL LABORATORY
CLINICAL MICROBIOLOGY ISOLATES
1986/87
With Comparison to 1985/86

A. RESPIRATORY	NUMBER OF ISOLATES 1985/86	1986/87
C. diphtheria:		
gravis toxigenic	21	15
gravis non-toxigenic	3	5
mitis toxigenic	4	2
mitis non-toxigenic	58	27
B. pertussis	5	4
Acid Fast Bacilli		
positive culture	56	58
positive smears	20	10
Legionella:		
L. pneumophila	6	3

B. MYCOLOGY	NUMBER OF ISOLATES 1985/86	1986/87
Presumptive Tinea versicolor	18	13
Candida albicans	1034	1052
Yeast, not C. albicans	95	200
Dermatophytes	53	58

C. STD	NUMBER OF ISOLATES 1985/86	1986/87
N. gonorrhoea	1349	1583
C. trachomatis	3197	5401
T. vaginalis	2144	410
G. vaginalis	364	Test Discontinued

CLINICAL MICROBIOLOGY (continued)

D. MISCELLANEOUS	NUMBER OF ISOLATES 1985/86	1986/87
C. difficile non-toxigenic	256	284
C. difficile toxigenic	238	324
Streptococcus Group A	1717	1180
Streptococcus Group B	1232	940
N. meningitidis	21	28
L. monocytogenes	1	0
H. ducreyi	2	0
C. difficile cytotoxin	0	324

E. ENTERICS	NUMBER OF ISOLATES 1985/86	1986/87
Escherichia Coli Group:		
08:K25	2	0
026:K60	24	26
055:K59	58	30
086a:K61	7	15
0111:K58	19	13
0119:K69	1	1
0125:K70	17	19
0126:K71	29	30
0127a:K63	5	3
0128:K67	25	29
0124:K72	0	1
018A018C:K77	0	1
0157:K7	0	3
075:Non-motile	0	1
non-enteropathogenic	49	58
Campylobacter fetus ss jejuni	156	160
Yersinia enterocolitica	20	19
Aeromonas hydrophila	140	199
Plesiomonas shigelloides	5	13
Shigella:		
S. boydii 1	1	0
S. flexneri 1	7	1
S. flexneri 2	10	20
S. flexneri 6	3	13
S. flexneri X	1	0
S. sonnei	87	42
S. dysenteriae sero 1	0	1
S. dysenteriae sero 2	2	4

CLINICAL MICROBIOLOGY (continued)

E. ENTERICS (continued)	NUMBER OF ISOLATES 1985/86	1986/87
Salmonellae:		
S. arizona	1	1
S. Group B undifferentiated	1	0
S. agona	7	7
S. brandenburg	2	1
S. heidelberg	24	15
S. minnesota	0	1
S. saint paul	19	13
S. schwarzengrund	2	1
S. typhi	12	4
S. typhimurium	68	125
S. senftenberg	0	3
S. infantis	7	12
S. montevideo	2	3
S. thompson	11	7
S. haardt	0	6
S. litchfield	4	2
S. muenchen	6	3
S. newport	3	13
S. enteriditis	38	16
S. havana	5	1
S. javiana	6	14
S. albany	10	1
S. nima	14	0
S. bredeney	3	3
S. hadar	42	97
S. poona	1	2
S. panama	1	1
S. java	1	2
S. hvittingfoss	0	6
S. new brunswick	1	0
S. tennessee	2	1
S. madelia	0	2
S. manhattan	0	3
S. lomita	1	0
S. virchow	0	3
S. stanley	1	1
S. johannesburg	1	4
S. mbandka	1	1
S. derby	3	2
S. untypable	19	1
S. bovis morbificans	1	38
S. species	0	11
S. paratyphi B	0	1
S. anatum	0	3
S. blockley	0	7
S. miami	0	1
S. ohio	0	2
S. typhimurium copenhagen	0	1

F. Percentages of Organisms Resistant to Antibiotics (Selected)

	Ticarcillin	Gentamicin	Tobramycin	Amikacin	Ampicillin	Tetracycline	Co-Trimazole	Chloramphenicol	Nitrofurantoin	Cephalothin	Cefoxitin	Cefotaxime	Methicillin	Erythromycin	Clindamycin	Penicillin	Vancomycin		No. Tested
Acinetobacter anitratus	100	0			74	19	10		100	91	75								58
Acinetobacter lwoffi		0			23	7	19		100	68	42								123
Aeromonas hydrophila		0			95	3	5	0	0	53	9			0					170
Citrobacter diversus		0			100	0	0		25	0	0								7
Citrobacter freundii		7			66	30	44		12	56	71	0							94
Enterobacter aerogenes		0			94	18	8		62	88	100								17
Enterobacter agglomerans		0			78	8	16		39	43	5								63
Enterobacter cloacae		1			91	20	8		51	95	89								132
Escherichia coli	62	<1	0	0	57	23	20	0	4	25	1	0							2,941
Klebsiella oxytoca		0			96	6	2		11	6	0								110
Klebsiella ozaenae		5			74	16	31		10	21									19
Klebsiella pneumoniae	100	2	67	0	98	17	14	0	46	7	8	0							344
Morganella morganii	100	1.6		0	98	40	13	0	79	95	11	0							62
Moraxella sp.		9			9	6	67		56	4	0								54
Plesiomonas shigelloides		0			57	0	0	0		0									7
Proteus mirabilis		<1			39	99	10	0	96	1	3								278
Proteus vulgaris		0			96	86	16		95	82	0								28
Pseudomonas aeruginosa	16	13	3	71								80							287
Pseudomonas cepacia	37	92	76	63	100							8							25
Salmonella heidelberg		0			0	67	0	0		0									6
Salmonella bovis morbificans		0			0	17	0	0		0									19
Salmonella hadar		0			10	98	0	0		2									60
Salmonella typhimurium		0			20	10	0	0		3									61
Serratia marcescens		0			94	88	18		100	100	5								33
Shigella flexneri type 2		0			80	31	7	0		53									16
Shigella flexneri type 6		0			100	100	0	100		31									13
Shigella sonnei		0			27	78	14	0		5									37
Staphylococcus aureus		6					2			<1			<1	7	1	90	0		2,367
Staphylococcus epidermidis		9	50		40	60	28	5	40	9			13	34	15	66	0		194
Staphylococcus saprophyticus		<1					10			18			21	39	5	52			145
Streptococcus faecalis	0				1	66	13		6					52		50	0		721

TABLE VI

CADHAM PROVINCIAL LABORATORY
VIRUS ISOLATIONS
1986/87
with comparison to 1985/86

VIRUS ISOLATIONS	1985/86 NO. OF DETECTIONS	1986/87 NO. OF DETECTIONS
ADENOVIRUS		
Unconfirmed Adenovirus and Echovirus Type 22	-	1
Unconfirmed Adenovirus and Unconfirmed Enterovirus	-	1
Adenovirus - unconfirmed	Not available	26
Adenovirus - untyped	43	38
Adenovirus 1	26	32
Adenovirus 2	34	26
Adenovirus 3	17	14
Adenovirus 4	0	0
Adenovirus 5	15	9
Adenovirus 6	3	5
Adenovirus 7	41	4
COXSACKIE		
Coxsackie A17	4	0
Coxsackie B2	39	0
Coxsackie B3	17	0
Coxsackie B4	3	0
HERPES		
Varicella zoster	26	19
Cytomegalovirus	80	132
Herpes simplex	1,445	1,444
Herpes simplex 01	0	2
Herpes simplex 02	1	2
Herpesvirus (by E.M.)	31	21
Herpesvirus (by I.D. & F.A.)	-	-
ECHOVIRUS		
Echovirus	0	2
Echovirus 7	8	9
Echovirus 9	5	14
Echovirus 11	0	7
Echovirus 14	0	6

VIRUS ISOLATIONS (Cont'd)	1985/86 NO. OF DETECTIONS	1986/87 NO. OF DETECTIONS
ECHOVIRUS (cont'd)		
Echovirus 17	0	5
Echovirus 18	10	0
Echovirus 21	15	3
Echovirus 22	34	5
CORONAVIRUS	15	14
INFLUENZA		
Influenza A	67	3
Influenza B	29	10
PARAINFLUENZA		
Parainfluenza 01	2	0
Parainfluenza 02	0	1
Parainfluenza 03	6	11
POLIOVIRUS		
Poliovirus 01	23	24
Poliovirus 02	40	29
Poliovirus 03	40	17
Poliovirus not typed	1	1
Poliovirus 1-2-3	0	2
ENTEROVIRUS Not typed	236	149
MOLLUSCUM CONTAGIOSUM	4	0
POXVIRUS	0	1
MYXOVIRUS Not typed	42	2
ROTAVIRUS	207	227
RESPIRATORY SYNCYTIAL VIRUS	155	95
SMALL ROUND ENTERIC VIRUS	77	18
REOVIRUS		
Reovirus 01	0	1
Reovirus 02	4	2
Reovirus 03	0	1
Reovirus not typed	6	6

VIRUS ISOLATIONS (Cont'd)	1985-1986 NO. OF DETECTIONS	1986-1987 NO. OF DETECTIONS
MUMPS	0	1
PAPILLOMAVIRUS		
Papillomavirus 06	0	137
Papillomavirus 11	0	140
Papillomavirus 16	0	59
Papillomavirus 18	0	59

TABLE VII

ENVIRONMENTAL MICROBIOLOGY
NUMBER OF SAMPLES TESTED
1986/87
With Comparison to 1985/86

	1985/86	1986/87
A. WATER - ROUTINE		
Membrane Filtration (MF)	36,081	*35,190
Most Probable Number (MPN)	9,924	8,000
Standard Plate Counts (SPC)	20,268	21,965†
Total Water Tested	45,325	43,190
* Recreational water projects not included.		
† SPC is a second test done on chlorinated samples tested for coliforms		

B. FOOD		
Surveillance		
Food	170	424
Ice Cream	1,836	1,614
Outbreaks		
Food	168	256
Total	2,174	2,294

	1985/86	1986/87
C. WATER TESTED FOR LEGIONELLA:		
SOURCE/SAMPLE TYPE		
Hospitals	272	88
Swimming Pools/Whirlpools	5	2
Lakes	11	0
Water Trucks	1	0
Private Homes	6	6
Miscellaneous-Aquariums, humidifiers, cooling towers	2	1
Total	297	97

D. WATER TESTED FOR PARASITES (GIARDIA)		
SOURCE/SAMPLE TYPE		
Lakes	48	3
Swimming Pools	0	1
Wells	0	3
Dugouts	0	1
Nursing Station	0	1
Sludge	0	2
Total	48	11

E. WATER TESTED FOR PSEUDOMONAS		
SOURCE/SAMPLE TYPE		
Swimming Pools	165	101
Whirlpools	506	386
Other	3	52
Total	674	539

ENVIRONMENTAL MICROBIOLOGY

TABLE VIII

DETAILS/RESULTS OF TESTS DONE ON WATER
1986/87

1) MEMBRANE FILTRATION (MF) - ROUTINE TESTING

SAMPLE SOURCE/TYPE	TOTAL COLIFORM		FECAL COLIFORM	
	Total Number Tested	Number Positive	Total Number Tested	Number Positive
Raw	2,682	403	105	37
Municipal	18,112	311	1,027	39
Well	1,351	479	294	13
Lake	639	156	260	34
River	796	495	796	413
Ice	125	15	2	0
Swimming Pool	3,140	126	83	5
Water Mains	1,032	36	176	0
Miscellaneous (Pumphouse, standpipe, Cisterns, Ponds, Dugouts, Hydrants, Basins)	2,740	348	1,830	193
TOTAL	30,617	2,369	4,573	734

ii) MOST PROBABLE NUMBER (MPN) - ROUTINE TESTING

SAMPLE SOURCE/TYPE	TOTAL COLIFORM		FECAL COLIFORM	
	Total Number Tested	Number Positive	Total Number Tested	Number Positive
DRINKING:				
Tap	1,025	283	613	86
Well	316	137	176	50
Water Truck	131	48	108	32
Pumphouse	73	18	40	5
Standpipe	32	5	18	1
Bucket, Barrel	87	72	45	28
Lake	209	164	118	35
River	52	34	37	18
Miscellaneous	192	51	149	12
SUB-TOTAL	2,117	812	1,304	267
OTHER:				
Lake	32	7	13	2
River	142	62	108	26
Sewage	1,704	630	1,704	607
Miscellaneous (Dugouts, Ditches, Ponds, Creeks)	196	77	131	31
TOTAL	4,191	1,588	3,270	933

ENVIRONMENTAL MICROBIOLOGY (cont'd)

iii) PSEUDOMONAS AERUGINOSA (MPN) - ROUTINE TESTING

SOURCE/SAMPLE TYPE	TOTAL NUMBER TESTED	NUMBER POSITIVE
Swimming Pools	101	6
Whirlpools	386	92
Others	52	7
TOTAL	539	105

iv) LEGIONELLA SPP.- ON REQUEST

SOURCE/SAMPLE TYPE	TOTAL NUMBER TESTED	NUMBER POSITIVE
Hospital Water	88	18
Swimming Pools/Whirlpools	2	0
Private homes, tap water	6	3
Cooling towers	1	1
TOTAL	97	22

ENVIRONMENTAL MICROBIOLOGY (cont'd)

v) STUDY OF WADING POOLS (CITY OF WINNIPEG)

NUMBER TESTED	TEST PARAMETER	NUMBER POSITIVE
302	Total Coliform (MF)	12*1
293	Standard Plate Count	53*2
58	Staphylococcus aureus (MF)	12*3
41	Pseudomonas	0*4
3	Fecal Streptococcus (MF)	0*5

*1 >2/100 ml
*2 >10/1 ml
*3 >0/100 ml
*4 >0/100 ml
*5 >0/100 ml

vi) RECREATIONAL WATER STUDY (MF)

	FECAL COLIFORM		E. COLI		FECAL STREPTOCOCCUS	
TOTAL NUMBER SAMPLES	NUMBER TESTED	NUMBER POSITIVE*	NUMBER TESTED	NUMBER POSITIVE*	NUMBER TESTED	NUMBER POSITIVE*
2709	1188	97	333	36	1188	486

* Fecal Streptococcus >50/100 ml
E. coli >200/100 ml
Fecal Coliform >200/100 ml

ENVIRONMENTAL MICROBIOLOGY (cont'd)

DETAILS/RESULTS OF TESTS DONE ON FOODS
1986/87

i) ROUTINE TESTING

	TOTAL NUMBER TESTED	NUMBER POSITIVE
Surveillance: Food	424	172
Ice Cream	1,614	313
Outbreaks: Food	256	100
TOTAL	2,294	585

ii) PROJECTS

	TOTAL NUMBER TESTED	*NUMBER OF UNACCEPTABLE RESULTS
Sandwich Survey	135	109
Salad Bar Survey	189	118
BBQ Duck and Pork Survey	41	5
TOTAL	365	232

* Unacceptable results:

SPC	>300,000/gram
TC	>100/gram
FC	>0/gram
Staph	>50/gram
Salmonella	>0/gram

TABLE IX

SEROLOGY/PARASITOLOGY OVERALL STATISTICS
1986/87

	NUMBER OF SPECIMENS	NUMBER OF TESTS	NUMBER OF UNITS
SEROLOGY	94,977	219,771	2,969,573
R&D SEROLOGY	-	4,707	107,902
PARASITOLOGY	10,963	10,979	494,055
TOTAL	105,940	235,457	3,571,530

SYPHILIS SEROLOGY

	1984-1985		1985-1986		1986-1987	
	Number of Specimens	Number Reactive	Number of Specimens	Number Reactive	Number of Specimens	Number Reactive
Blood	54, 757	961	54,678	892	55,267	740
CSF	531	8	356	4	440	3
IFA	44	2	51	5	42	3

	1983-1984	1984-1985	1985-1986	1986-1987
No. Persons Reactive with Previous History	743	814	748	645
New Cases	23	86	69	43
New Cases in Registry	85	61	75	58

SEROLOGY (cont'd)

BACTERIAL AND MISCELLANEOUS SEROLOGY

	1985/86			1986/87		
	Number Tested	Number Positive	Positive Percent	Number Tested	Number Positive	Positive Percent
Widal	144	14	9.7	87	9	10.3
Brucella abortus	430	8	1.9	404	9	2.2
Pasteurella tularensis	53	5	9.4	38	5	13.2
Thyroglobulin antibody	580	55	9.5	602	38	6.3
Microsomal antibody	577	150	26.0	602	105	17.4
Antinuclear factor	1,244	37	3.0	1,197	64	5.3
Antimitochondrial	NA	NA	NA	23	4	17.4
Anti Smooth Muscle	NA	NA	NA	5	0	-
Rheumatoid factor	2,754	213	7.7	3,050	150	4.9
CRP	278	47	16.9	257	41	16.0

RUBELLA SEROLOGY

A. Number of Rubella Tests

	1985/86	1986/87
PHA Screening	23,241	23,907
PHA Diagnostic	6,117	5,120
IgM	792	666

B. Details of Prenatal Surveillance

	1985-1986			1986-1987		
Test	Number Tested	Susceptible	Percent	Number Tested	Susceptible	Percent
PHA	11,692	301	2.6	14,251	347	2.4

C. Details of Rubella Diagnostic Testing

	1985-1986			1986-1987		
Test	Number Tested	Number with IgM Present	Percent	Number Tested	Number with IgM Present	Percent
IgM	792	21	2.7	666	3	0.5

SEROLOGY (cont'd)

IMMUNE STATUS SEROLOGY

	1985/86		1986/87	
	Number Tested	Percent Susceptible %	Number Tested	Percent Susceptible %
Measles	NA	-	154	9.7
Mumps	181	17.7	93	17.2
Diphtheria	222	34.2	469	43.7
Tetanus	226	24.8	471	33.8
Pertussis	276	13.8	199	6.0
Varicella/ Zoster	1,622	9.7	1,503	6.1

SEROLOGY (cont'd)

HEPATITIS SEROLOGY

	1985/86			1986/87		
	Number Tested	Number Positive	Percent Positive	Number Tested	Number Positive	Percent Positive
HBsAg	11,383	559	4.9	11,733	463	3.9
Anti HBs	2,026	1,000	49.4	1,269	574	45.2
Anti HBc	863	335	38.8	396	88	22.2
HBeAg	377	120	31.8	268	118	44.0
Anti HBe	360	142	39.4	271	107	39.5
HAV IgG/IgM	1,373	554	40.3	58	27	47.0
HAV IgM	2,512	292	11.6	2,709	158	5.8
Anti HBcIgM	119	4	3.4	31	9	29.0
Anti Delta	NA	NA	NA	41	1	2.4

TOXOPLASMA DIAGNOSTICS - IgM

1985-1986			1986-1987		
Number Tested	Number Positive	Number Prenatal Positive	Number Tested	Number Positive	Number Prenatal Positive
82	6	0	949	10	NA

RESPIRATORY SEROLOGY

A. Tests Done on Single Bloods	1985/86		1986/87	
	Number Tested	Number Positive	Number Tested	Number Positive
ASOT	2,770	569	2,063	435
ADB	266	46	156	19
Cold Agglutinins	689	16	515	44
Infectious mononucleosis (spot test)	2,784	91	2,377	63

B. Tests Done on Paired Bloods

	1985/86				1986/87			
	Number Tested	Sero-conversion	Significant Change in Ab	High Static	Number Tested	Sero-conversion	Significant Change in Ab	High Static
Adenovirus	2,142	14	3	26	1,566	4	2	12
RSV	1,955	6	3	8	1,461	4	-	4
Parainfluenza 1	1,975	3	2	4	1,437	3	1	2
Parainfluenza 2	1,983	1	1	2	1,437	6	-	-
Parainfluenza 3	1,987	5	-	12	1,447	4	1	6
Influenza A	2,080	45	25	45	1,713	24	9	20
Influenza B	2,051	41	13	16	1,683	13	1	20

B. Tests Done on Paired Blood (cont'd)

	1985/86					1986/87				
	Number Tested	Seroconversion	Significant Change in Ab	High Static	Presence IgM	Number Tested	Seroconversion	Significant Change in Ab	High Static	Presence IgM
Mycoplasma pneumonia	2,485	35	12	96	137	2,973	28	18	37	313
Legionella spp.	699	8	-	73	21	741	1	1	19	9
Chlamydia spp.	257	3	-	5	10	221	1	1	8	10
Q Fever	178	-	1	-	-	216	1	-	-	-

SEROLOGY (cont'd)

HERPES SEROLOGY

Microorganism:	1985/86				1986/87			
	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive
Herpes simplex	1,822	6	8	26	1,502	4	15	66
Herpes zoster	609	6	0	8	1,120	3	1	31
Cytomegalovirus	2,288	3	5	25	1,616	3	6	36
Epstein-Barr IgM	1,627	NA	NA	144	1,663	NA	NA	134

MISCELLANEOUS VIRUS SEROLOGY

	1985/86				1986/87			
	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive
Measles	1,907	5	177	144	2,506	-	140	147
Mumps	318	1	3	1	650	1	4	12

	1985/86			1986/87		
	Number Tested	Sero-conversion	High Static Titre	Number Tested	Sero-conversion	High Static Titre
RMSF	24	-	-	20	-	-
Rotavirus	215	-	1	295	7	6

TABLE X

CADHAM PROVINCIAL LABORATORY
METABOLIC DISEASE FINDINGS
1986-/87

	IDENTIFIED IN 1986/87	TOTAL FROM 1965 TO MARCH 31, 1987
PKU	-	19
GALACTOSEMIA	-	5
GALACTOSEMIA VARIANTS	6	9
PROLINEMIA	-	3
HISTIDINEMIA	1	18
MAPLE SYRUP URINE DISEASE	-	2
TYROSINEMIA	-	1
HYPOTHYROIDISM	4	28
TBG DEFICIENCY	-	2
CYSTINURIA	1	8
GLYCINEMIA	-	1
HARTNUP DISEASE	-	5
TOTALS	12	101

TABLE XI

CADHAM PROVINCIAL LABORATORY
DIAGNOSTIC CHEMISTRY SECTION YEARLY STATISTICAL TABULATION
1986/87

TEST NAME	LAB CODE #	NO. OF PATIENTS	NO. OF CONTROLS	NO. OF STANDARDS	NO. OF REPEATS	TOTAL NO. OF TESTS	UNIT VALUE	TOTAL UNITS
CHOLESTEROL (TOTAL)	00498	2,981	533	680	166	4,414	3	13,242
HDL-CHOLESTEROL		1,357	387	336	87	2,167	5	10,835
TRIGLYCERIDES	00984	2,667	704	275	156	3,802	3 (IF NO CHOL.RUN ON SAME SPEC.)	3,802
IRON AND TIBC	00650	390	133	72	21	616	15	9,240
IRON	00648	75	25	18	20	138	10	1,380
THYROXINE (T4)	00978	3,816	555	761	106	5,024	7	35,168
T3 UPTAKE	00977	1,381	457	119	10	1,967	7	13,769
TSH	00975	2,124	440	888	31	3,484	7	24,388
VIT. B12 AND FOLATE	01050	591	228	430	25	1,274	7	8,918
DIGOXIN	00313	920	536	84	38	1,578	4	6,312
THEOPHYLLINE	00312	552	561	66	51	1,230	3	3,690
GENTAMYCIN	00312	159	169	102	101	531	3	1,593
CHOLINESTERASE		446	110	2	34	592	3	1,746
VENIPUNCTURE (IN CPL)	00212	11	10		1	22	8	176
GLYCATED HEMOGLOBIN	01054	343	80		43	466	12	5,992
YEAR TOTALS		17,804	4,928	3,833	890	27,305		140,251

TABLE XII

CADHAM PROVINCIAL LABORATORY
INFLUENZA/RESPIRATORY SURVEILLANCE**
October 16, 1986 - April 15, 1987

	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	TOTAL	S	VI
INFLUENZA A*			1	6	27	13	10	57	55	2
INFLUENZA B				1	1			2	2	0
ADENO	6	7	3	3	1	4	3	27	9	18
RSV			3	8	47	43	25	126	0	126
PARAFLU (1,2,3)		1	8	4	2	3	2	20	8	12
MYCOPLASMA PNEUMONIAE	3	43	50	27	32	18	5	178	178	0
							TOTAL	410	252	158

S = Serology
VI = Virus Isolation

*Influenza A (H_1N_1) resembling A/Taiwan/1/86 more than A/Chile/ 1/83 strain.

- not as large an outbreak as in 1985-86.
- appeared in December/86 peaked in Feburary, continued on in March and April.
- only 2 Influenza B

FIGURE 1

CADHAM PROVINCIAL LABORATORY
INFLUENZA SURVEILLANCE
LABORATORY DIAGNOSED CASES
October 16, 1986 - April 15, 1987

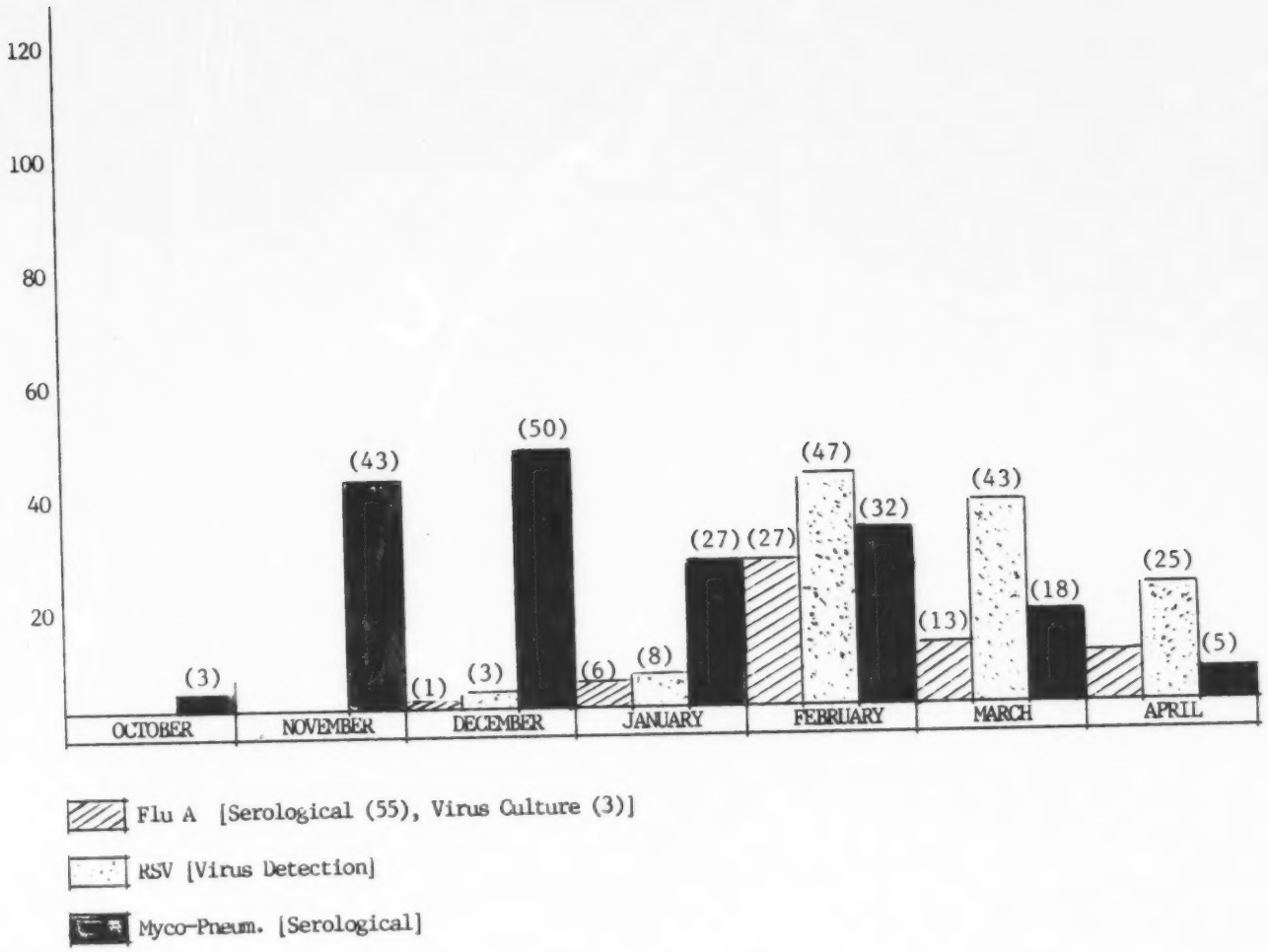
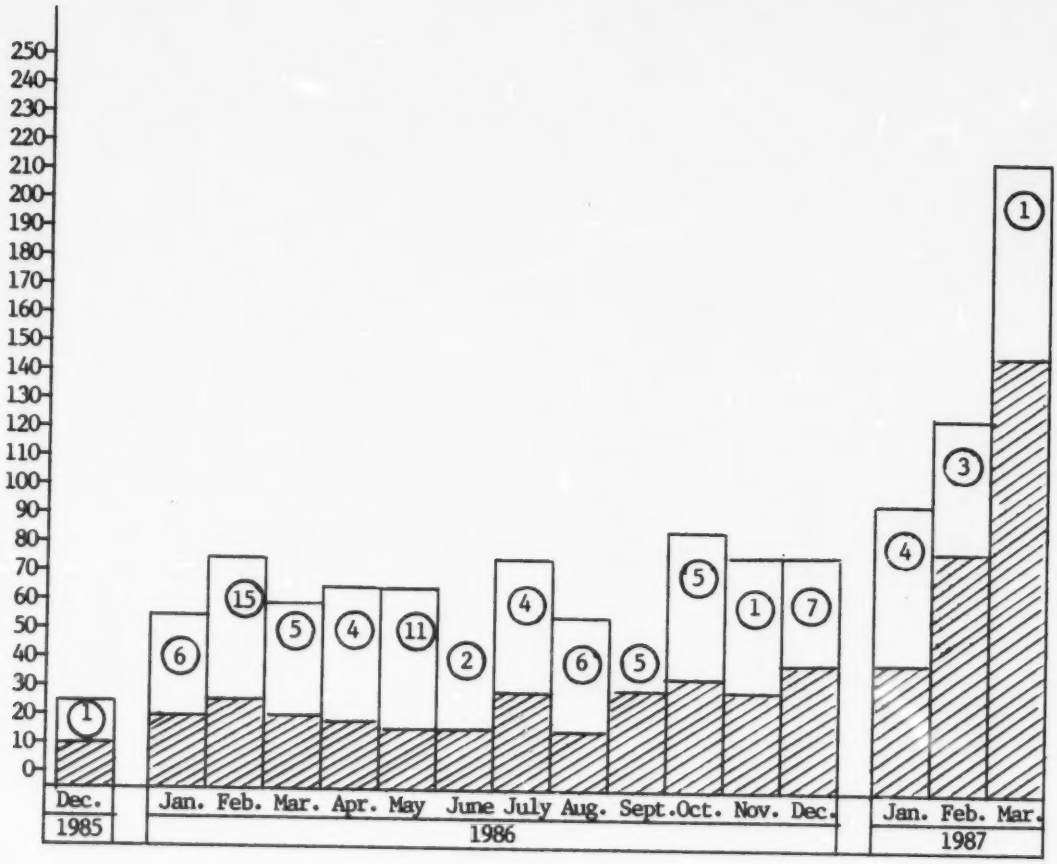


FIGURE 2

CADHAM PROVINCIAL LABORATORY
DIAGNOSTIC ANTI HIV

Number of Sera Tested/Month
December 1985-March 1987



"Non-high risk" persons: number tested

Number of positives